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State of Maine Energy Assurance & Emergency Management Plan 2012

Maine Governor's Energy Office

State of Maine

Governor's Energy Office

Energy Assurance and Emergency Management Plan

STATE OF MAINE
OFFICE OF THE GOVERNOR
22 STATE HOUSE STATION
AUGUSTA, MAINE
04333-0001

PAUL R. LEPAGE
GOVERNOR

KENNETH C. FLETCHER
DIRECTOR
GOVERNOR'S ENERGY OFFICE

July 2012

Honorable, Governor Paul R. LePage
State of Maine Office of the Governor
1 State House Station
Augusta, Maine 04333-0001

RE: State of Maine Energy Assurance and Emergency Management Plan

Dear Governor LePage:

The Maine Governor's Energy Office is responsible for developing and revising the State of Maine Energy Assurance and Emergency Management Plan. The purpose of the Energy Assurance Plan is to provide the Governor, the Legislature, the Executive Departments, the energy industry and the general public with a clear, concise and comprehensive blueprint and strategy to address a potential or actual energy emergency caused by a supply disruption, a rapid and unsustainable increase in energy prices or other energy emergency situation.

The GEO created Maine's first energy emergency plan in 2008 in response to Maine citizens' increasing vulnerability to rapid price escalations, fossil fuel supply curtailments and infrastructure disruptions. The American Recovery and Reinvestment Act (ARRA) provided states with an opportunity to revise the plan to build greater capacity and resiliency for energy assurance and emergency planning and response.

The State of Maine Energy Assurance and Emergency Management Plan is designed to be a living document that will be presented to the U.S. Department of Energy and updated every two years.

Sincerely,

Kenneth C. Fletcher

Kenneth C. Fletcher
Director
Governor's Energy Office

Acknowledgements

Jeff Marks with the Environmental and Energy Technology Council of Maine and formerly with the Governor's Energy Office was responsible for the management, coordination and oversight of the *State of Maine Energy Assurance and Emergency Management Plan* and the State Energy Program Energy Assurance Grant.

Thank you to all of the contributing organizations, departments, and agencies and their staff members who provided us with assistance and information, including Bruce Fitzgerald, Jonathan Burbank and Lynette Miller with the *Maine Emergency Management Agency*, Christopher Kroot and Michael Smith with the *Maine Office of GIS,* Maria Jacques and Faith Huntington with the *Maine Public Utilities Commission*.

We appreciate the dedicated, professional and enthusiastic reporting approach of Kent Frantzve and Todd Schmit of *AZ-Tech International* for the Plan's revision and update.

Michael Barden with the Governor's Energy Office assisted with the final editing and production of the Plan.

This *State of Maine Energy Assurance and Emergency Management Plan 2012* contains proprietary information prepared by AZ-Tech International for the State of Maine Governor's Energy Office in compliance with the American Recovery and Reinvestment Act (ARRA) of 2009 Energy Assurance Grant Program, Contract Number: CT20101203000000002886.

Kenneth C. Fletcher

Director

Maine Governor's Energy Office

Contents

1. Executive Summary

A. Background

The United States is vulnerable to unreliable, insecure and expensive foreign fossil fuel products for its energy needs. The State of Maine is dependent on fossil fuel products to heat its homes, buildings and factories. The significant consumption of imported petroleum is a growing factor in international, national and state environmental degradation, economic uncertainty and energy insecurity. The State of Maine Comprehensive Energy Action Plan (Maine Energy Plan) provides a short and long-term strategy to achieve energy independence and security with clean, reliable, affordable, sustainable, indigenous and renewable resources. Through the Maine Energy Plan and its reliance on cooperative public and private partnerships, sound public policy and innovative energy programs, we can achieve the objectives of energy security, economic development and environmental quality for Maine's future.

In June 2008, the Governor's Office of Energy Independence and Security (now the Governor's Energy Office) published the first *State of Maine Energy Emergency Management Plan* and in 2011 updated the Plan to incorporate existing, emerging and new energy portfolios, technologies and concepts including Smart Grid applications and vulnerabilities, critical infrastructure interdependencies and cyber security into the new Energy Assurance Plan. The new *Energy Assurance and Emergency Management Plan* will assist with identifying additional energy hazards; coordinating with state agencies and private sector stakeholders on areas of critical concerns; collecting and disseminating critical energy information to the federal government, Maine Governor, Legislature and the public; communicating with relevant international, federal, state and local officials to maintain the effectiveness of the plan; and work with ISO New England, natural gas producers, heating fuel distributors and electricity generators to achieve energy assurance.

The 2012 Energy Assurance Plan will provide a clear, concise and comprehensive blueprint and strategy to address a potential or actual energy emergency caused by a supply disruption, a rapid and unsustainable increase in energy prices or other energy emergency situation. The Plan will enhance Maine's ability to anticipate, respond to and recover from energy emergencies. The development of the original Plan recognized a clear need to expand and enhance Maine's expertise in energy planning and to improve

the State's ability to track Maine's critical energy infrastructure for energy assurance and emergency purposes. The updated 2012 Plan will also serve as an information resource to build support and development capacity for the energy assurance and emergency goals in Maine, in accordance with the objectives of the *State of Maine Comprehensive Energy Action Plan*.

The electric power sector is a growing share of the energy economy in Maine, the United States, and most of the world. This growth requires considerable investment and planning by power generating companies and state agencies.

Maine represents approximately 9% of the population in New England and 9% of the region's total electricity consumption. ISO New England forecasts the state's overall electricity demand to grow at a rate of 0.9% annually over the next decade.

The state relies on both in-state resources and imports of power over the region's transmission system to serve electricity customers. Transmission, generation, and demand resources are being added to the system to ensure that the reliability of the system is maintained. In addition, Maine is attracting large wind-power proposals.

Maine requires 30% of total retail electricity sales to come from renewable resources, and this requirement is currently being met by existing resources, with an additional 10% of new renewable generation as part of the portfolio required by 2017.

The State of Maine is also highly dependent on volatile imported fossil fuels to heat its homes, buildings and factories. Maine businesses and residences are approximately 75-80 percent dependent on fossil fuels for heating purposes and nearly 100 percent reliant on petroleum for transportation. The high percentage of households and businesses that depend on imported sources of petroleum drains dollars out of the state. It has been estimated that Maine exports more than $5 billion out of state due to petroleum expenditures alone.

The American Recovery and Reinvestment Act of 2009 (ARRA) was an effort to stimulate the national economy. It included measures to modernize our nation's energy and communication infrastructure and enhance energy independence. The U.S. Department of Energy (DOE), Office of Electricity Delivery and Energy Reliability (OE), provided ARRA grants to support State efforts to update and revise their State energy assurance plans.

The State of Maine was selected by DOE to participate in the energy assurance grant program.

B. The Energy Assurance and Emergency Management Plan

The *2012 Maine Energy Assurance and Emergency Management Plan* outlines the steps that may be taken by the state if an energy emergency occurs. The steps are designed to reduce the impact of an emergency on Maine's economy and its citizens' health and welfare. Energy Emergency and Assurance Planning defines the appropriate actions to be taken and provides for timely and coordinated notification to state and local government agencies, businesses, industries, institutions, the media, and residents in the event of an energy deficiency. The Plan also encourages voluntary integration of energy efficiency and renewable resources into emergency disaster recovery and planning for communities, businesses and individuals.

In addition to identifying the state's energy resources, infrastructure and the designated state agencies authorized to prepare for and address an acute energy emergency, this Energy Assurance and Emergency Management Plan identifies the critical public and private entities engaged in the energy industry at the international, regional, state and local levels of activity. Many of these public and private organizations are not only responsible for assisting the state in an energy emergency; they are directly responsible for the production, management, transmission and distribution of many of Maine's energy products and services within the state and region.

"The purpose of the *2012 Energy Assurance and Emergency Management Plan* is to provide the Governor, the Legislature, the Executive Departments, the energy industry and the general public with a clear, concise and comprehensive blueprint and strategy to address a potential or actual energy emergency caused by a supply disruption, a rapid and unsustainable increase in energy prices or other energy emergency situation."

If demand for an energy source exceeds supply, or if a disruption in energy supply distribution occurs, the state government's authority shall be exercised in responding to the energy emergency. The Plan offers numerous strategies for responding to varying degrees of an energy outage. It calls for reliance on energy markets, to the fullest extent possible, in responding to and resolving energy shortages or emergencies. State government intervention would occur only to the extent necessary.

C. Future Direction

Our nation, region and state have become vulnerably dependent upon unreliable, insecure and expensive foreign fossil fuel products. The wasteful and increasing combustion of foreign fossil fuel products contributes to environmental pollution, undermines our economic vitality, erodes our public health and diminishes the quality of life for all Maine citizens. Maine's ultimate energy goal is to transition from fossil fuels to the use of cost-effective energy efficiency and conservation, renewable and alternative energy resources and transitional fuels like natural gas for homes and businesses.

Maine's energy strategy is to decrease the total cost of energy (e.g., electricity, transportation, heating) in an enduring way that is environmentally responsible, optimizes economic growth, increases energy efficiency, reduces dependency on foreign oil and empowers people with the knowledge and capability to employ proven cost-effective technologies. For example, Maine can no longer bear the burden of the 12th highest priced electricity in the nation, which is an impediment to economic growth and private sector investment. Any energy plan must reduce the price of electricity in a way that significantly improves the State's relative competitive position.

Our Energy, Our Future

Accordingly, the Governor's Energy Office, in collaboration with other state agencies and private sector organizations, is committed to advancing the principles, programs and the comprehensive and integrated plans necessary to secure a safe, clean and affordable energy future. To accomplish these goals, it is essential to enter into a public / private partnership with energy distributors and consumers to clearly identify the strengths and weaknesses of the state's energy supply, storage, transmission, and distribution infrastructures.

2. Introduction

A. Purpose

Energy assurance is increasingly recognized as an important component of the nation's energy emergency planning, and also as a more comprehensive tactic intended to:

- Reduce the likelihood of energy emergencies;
- Reduce the potential severity and duration of energy emergencies; and
- Increase the reliability of access to the energy that underlies every aspect of people's lives and the economy.

Energy assurance involves a variety of proactive efforts to assure the availability of energy, regardless of circumstances. Energy supply disruptions ultimately affect activities at the local level; thus, local citizens should have a strong interest in comprehensive, integrated energy assurance planning designed to mitigate the cascading consequences of an energy supply disruption and to enable timely responses.

Municipal officials and local first responders are essential to energy assurance and security. Local officials can identify vulnerable infrastructure interdependencies that can interfere with energy assurance and provide state officials with valuable, real-time information during energy supply disruptions. For example, local officials can report on the operational status of motor vehicle fuel depots and outlets. This information can help state emergency management personnel direct emergency vehicles to still functioning outlets.

However, State and Federal emergency planning regarding energy infrastructure and supply disruptions has often been top-down and highly stove-piped. Agencies with certain emergency response functions might be unaware of other agencies' roles and responsibilities that would bear on the overall response and recovery. For example, electricity is necessary to operate gasoline and diesel fuel pumps. An intact highway infrastructure is also necessary for the delivery of heating fuels to homes and businesses. But, agencies responsible for planning adequate fuel supplies may have overlooked the importance of coordinating with agencies responsible for oversight of electricity infrastructure and supplies.

The American Reinvestment and Recovery Act (ARRA) provided an opportunity to address these needs by offering grants to State Energy Offices to build greater capacity and resiliency for energy assurance and emergency response. The Maine Public Utilities Commission (PUC) applied for and received a grant to develop a more comprehensive and integrated Energy Assurance Plan. Pursuant to the Funding Opportunity Number DOE-FOA-000091 Recovery Act – Enhancing State Government Energy Assurance Capabilities and Planning for Smart Grid Resiliency, the PUC developed a Project Management Plan (PMP) to enhance the State's energy assurance capabilities through training, tracking and emergency exercises activities. A core task of the PMP is to revise and enhance Maine's Energy Assurance Plan. The Governor's Energy Office, as the designated State Energy Office to receive and coordinate federal funding through the ARRA and the U.S. Department of Energy State Energy Program (SEP), has oversight responsibility for the Energy Assurance and Emergency Management Plan.

The primary purpose of this comprehensive and integrated ***State of Maine Energy Assurance and Emergency Management Plan for 2012*** is to provide the Governor, the Legislature, the local governments, the public utilities, the private energy industry and energy consumers with a clear understanding of the state's plans, processes, priorities, programs, personnel and timeframes to address the critical energy emergency issues of the 21st Century. In addition to identifying the state's energy resources, infrastructure and the designated state agencies authorized to prepare for and address an acute energy emergency, this Plan identifies the critical public and private entities engaged in the energy industry at the international, regional, state and local levels of activity.

This Plan defines a process for facilitating information and coordination during the period leading up to a potential energy emergency. It provides basic information on Maine's energy resources and examples of their vulnerabilities. Because potential energy emergency situations are varied and dynamic, no one plan could anticipate the unlimited number of possible scenarios and appropriate responses in advance. In effect, the Plan is a vehicle for identifying resources that can be brought to bear in a crisis situation and for establishing a framework so that those resources can be efficiently and effectively assembled, when needed. The plan cannot and should not be relied upon as a comprehensive or exhaustive reference for all potential actions, scenarios or responses.

Maine strongly believes that the people and businesses of the State should have the opportunity to make energy choices that are cost effective, as well as beneficial specifically to them. Emphasis will be placed on letting consumers drive energy innovation, efficiency and conservation. By promoting competitive diversity in new power sources (biomass,

wind, solar, nuclear, co-generation, tidal and hydro), it ensures greater energy assurance in the event of a power emergency.

B. Schedule for Review and Update

Comments on this plan will be received at all times. Any comment or question should be directed to the Governor's Energy Office and the Maine Emergency Management Agency (MEMA). Suggestions are welcomed and will be carefully considered in the preparation of future amendments.

The Governor's Energy Office is the state agency directly responsible for the development and maintenance of the State of Maine Energy Assurance and Emergency Management Plan and works in close collaboration with the Maine Emergency Management Agency. The Plan describes the transition from the energy pre-emergency planning phase, coordinated by the Governor's Energy Office, to the energy emergency response phase, coordinated by MEMA. It specifies that the Energy Office, in collaboration with the MEMA, will update the ***Maine Energy Assurance and Emergency Management Plan*** every two years.

It is anticipated that plan updates will be a cooperative effort, as it was with the development of this plan.

- MEMA is responsible for the maintenance of the State Emergency Operations Plan.
- Individual agencies are responsible for various existing programs and protocols referenced in this plan.
- An Emergency Task Force (ETF) may be activated at least every two years to evaluate the currency of the Plan and the resources it references, and to assist with updates.

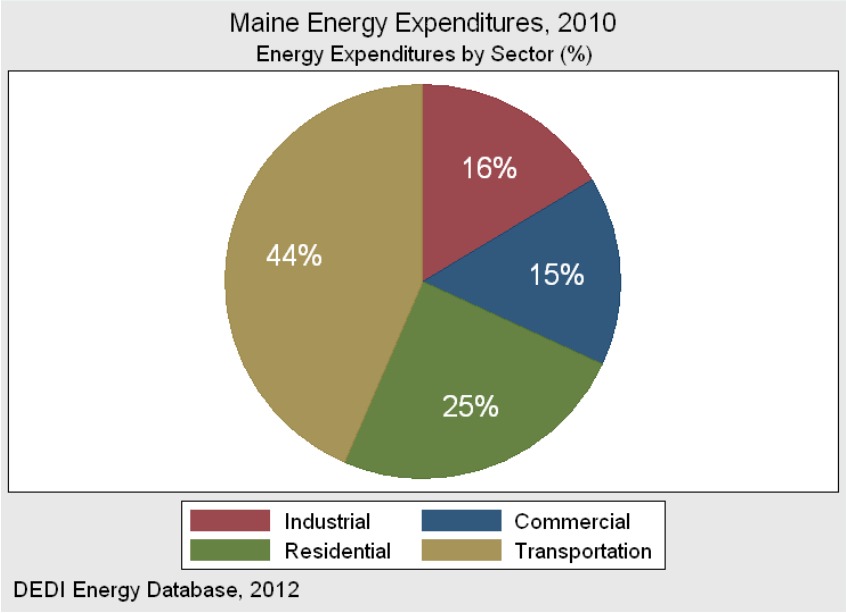
3. Description of Maine Energy Consumption and Expenditures

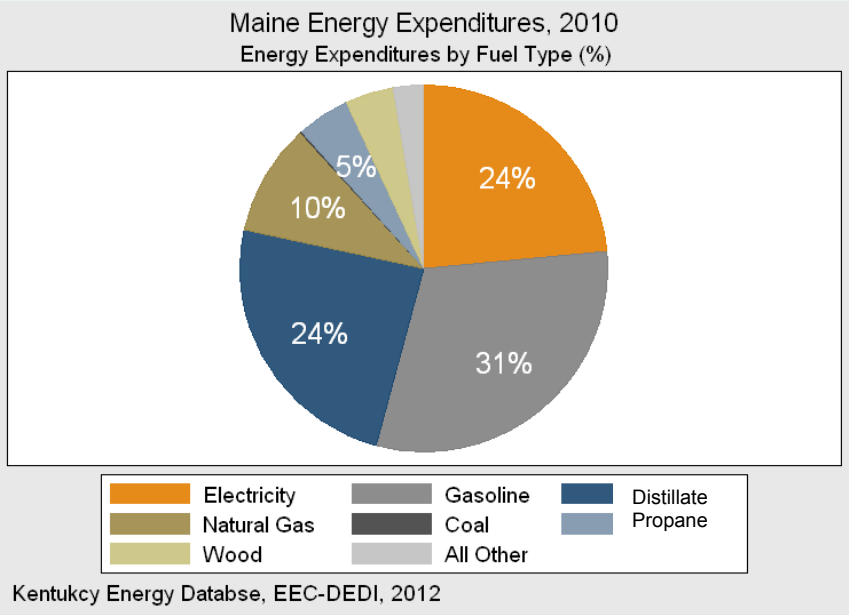
A. State Energy Profile

According to 2011 US Census Bureau estimates, the current population of Maine is 1.3 million people, ranking it 39th in the nation. In terms of population density, Maine has 41 persons per square mile, which is roughly half of the national average of 80 persons per square mile. Most of the population is concentrated along the eastern coast of Maine. The civilian labor force is .7 million workers strong or about half of the total population of the state. Maine's per capita personal income is $37,973 (the national average is $41,663). With slightly over 135,000 businesses operating in Maine, the State's Gross State Product is approximately $46.0 billion, ranking it 44th in the nation.

As New England's largest renewable energy producer, Maine is committed to developing its regionally strong bio-energy, on and offshore wind, and ocean energy resources into strong, nationally recognized markets. It is doing so through sustained research and development, supportive policy mechanisms, and permitting requirements. Of note are Maine's actions to become a leader in offshore renewable energy development, which may benefit the state by bringing hundreds of megawatts of clean energy to meet regional demand.

Maine's total energy expenditures for 2010 were $6.3 billion, an increase of 11% from 2009. Dividing these costs by economic sector, the transportation sector accounted for the largest amount of energy expenditures in 2010.





Analyzing energy expenditures by fuel type, the purchase of gasoline was the highest concentration of expenditures in Maine in 2010. Compared with 2009, total gasoline expenditures displayed an increase of 17% in 2010.

Energy Market

One of the ways in which the State hopes to reach its goal of achieving energy security is a commitment to supplementing its traditional logging industry with a biomass renewable energy industry. Biomass is the organic matter in trees, agricultural crops and other living plant material. It is made up of carbohydrates — organic compounds that are formed in growing plant life. Ever since the earliest inhabitants of the region burned wood in their campfires for heat, biomass has been a source of energy for meeting human needs in the Northeast. Maine has biomass generation facilities in various stages of operation that use wood, wood waste and municipal solid waste as feed stocks. It is also home to a developing biodiesel industry.

Maine's onshore wind industry is experiencing significant growth. A total of eight large-scale wind energy development projects are operating in the State of Maine with a total capacity of 345.5 megawatts (MW). These facilities are exclusive of a number of non-utility "community" scale wind projects that are also operational. In addition, there are two large-scale wind energy development projects under construction or in operational testing mode (at the time of publication) with a potential total of 84.8 MW of capacity, three projects that have been permitted but not yet under construction with a potential of 216 MW and at least four wind energy projects under review with the total potential capacity of 250.1 MW. Other

Maine-based wind projects are in discussion or appear in ISO-NE's queue (Independent System Operator – New England) but are not far along enough to be counted by either the DEP or LURC as a serious project at this time. There are no off-shore wind projects in operation or under development in Maine at this time.

Research institutions throughout the state are committed to developing the wind and ocean energy sectors. The U.S. Department of Energy recently awarded the University of Maine funding to establish the first offshore floating wind test site in the U.S. and provided a grant for a small business to perform testing on tidal power generator devices.

Natural gas will remain and grow as a primary source of fuel in residential utility and industrial sectors while Maine pursues increased use of biofuels and other energy efficiency and renewable energy technologies. Development and use of this energy resource may not only create jobs and bring needed economic development to struggling parts of the State, natural gas projects could also enhance Maine's energy security and reliability. While nearly 80 percent of Maine homes are still heated by oil, many of Maine's larger cities and towns have access to natural gas. With the high cost of heating oil, the state's gas utilities are reporting that they cannot keep up with increased inquiries from consumers who are looking to convert their homes to natural gas.

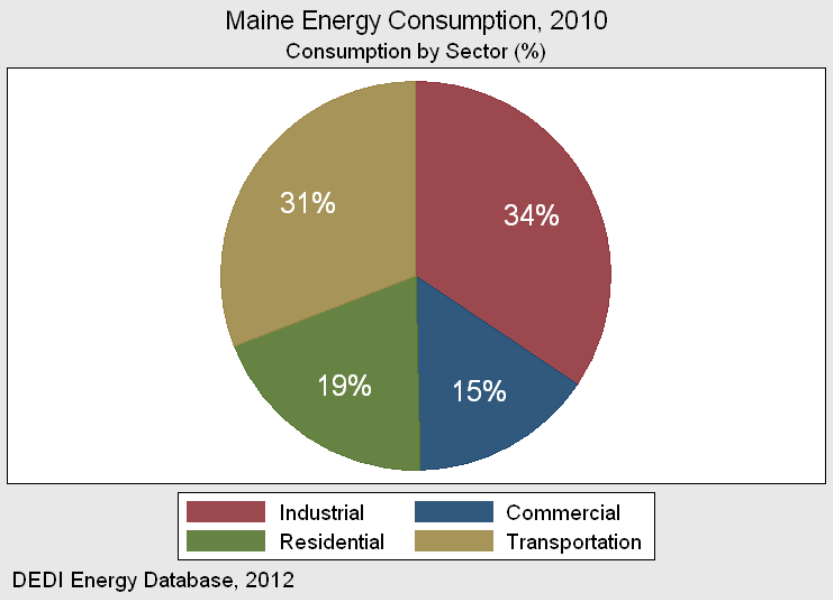
While nuclear energy has not been a primary component of Maine's Energy Plan, examination of nuclear energy and the safe storage, processing, transportation and disposal of nuclear fuel, waste and materials derived from nuclear activities is imperative to a sound energy security policy.

Economic Development

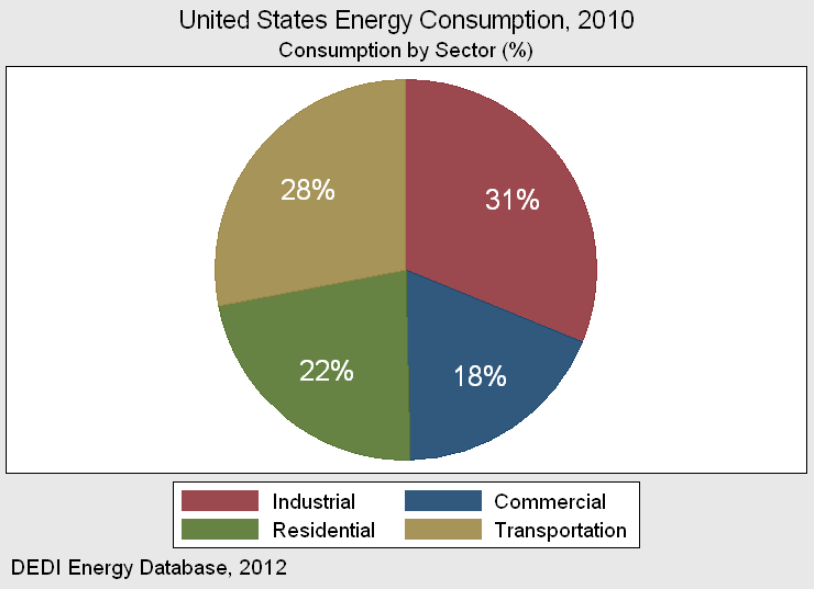
- From 2008 to 2009, Maine's renewable energy and energy efficiency companies attracted $1 million in venture capital and private equity investment (Bloomberg New Energy Finance [BNEF]).
- Four renewable energy projects in Maine have disclosed values, representing $287 million (BNEF).
- As of August 2010, Maine has received $8.1 million for 2 renewable energy projects and $41.5 million for 7 clean energy tax credits and grants from the Recovery Act.
- In 2009, the renewable energy industry supported 1,737 direct and indirect renewable energy jobs in Maine, comprised of 1,143 from solar energy, 126 from bio-energy, 445 from wind energy, and 23 from hydroelectric (Navigant Consulting, Inc.).

B. Energy Consumption

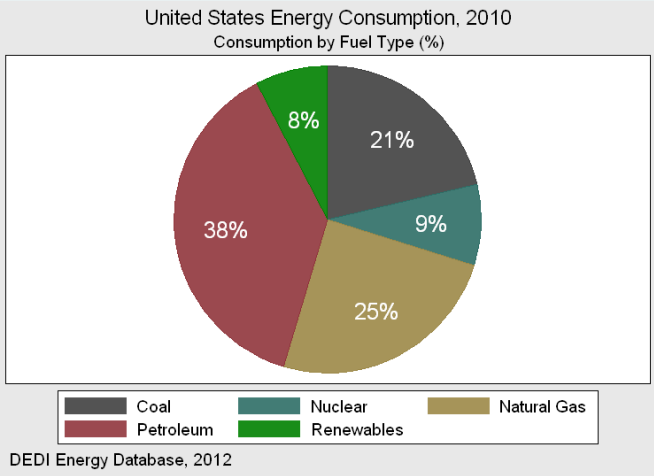
Maine's total energy consumption in 2010 was .41 quadrillion Btu, an increase of 2% from 2009. Dividing this consumption by economic sector, the industrial sector accounted for the largest amount of energy consumption in 2010.

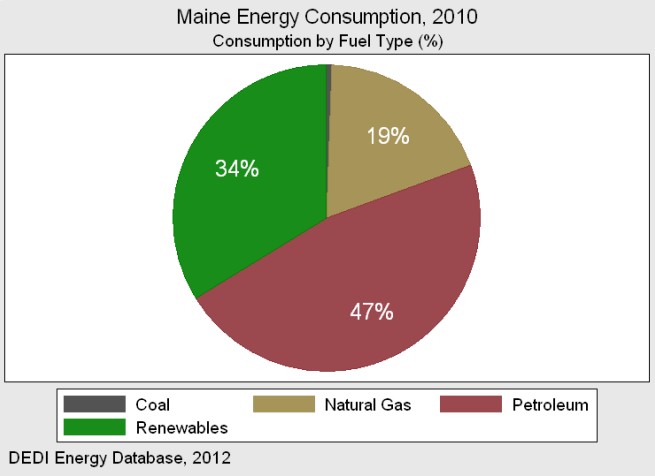


The distribution of total energy consumption in Maine by economic sector is generally consistent with the national average. Maine's industrial sector being 3% larger than the national average, and Maine's commercial sector 3% smaller in 2010.

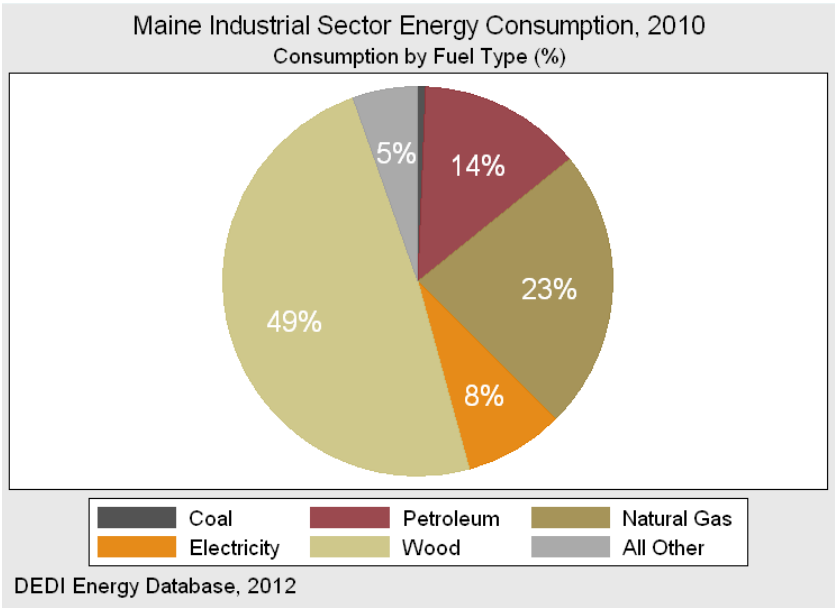


Characterizing energy consumption by fuel type or commodity, the use of petroleum was the highest concentration of energy consumption in Maine in 2010. Compared with 2009, the consumption of petroleum products displayed a decrease of 3% in 2010. Additionally, net electricity imports are included in energy consumption, and can explain the difference in the summed value and stated value for total energy consumption.

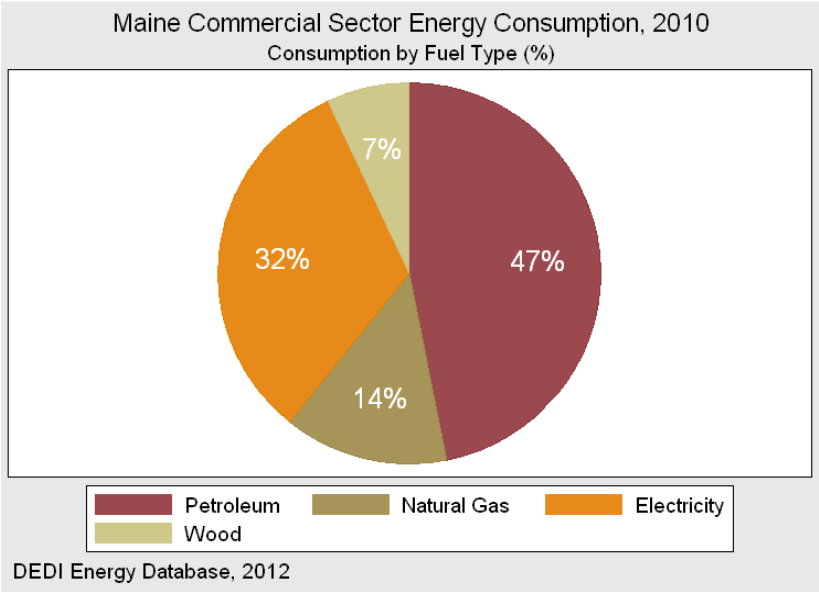




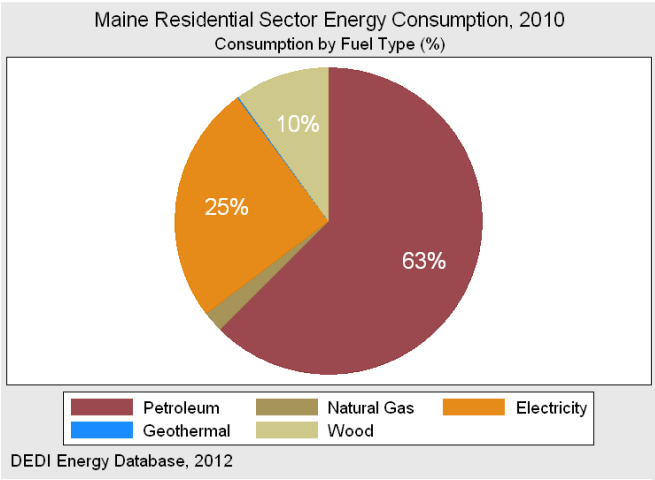
In terms of total energy consumption, dependence upon renewable hydro, woody biomass, and wind electricity generation made Maine the third highest renewable energy consumer in the United States after hydroelectric states of Washington and Oregon. Over 1/3 of total energy consumed in Maine came from renewable energy resources, versus only 8% for the United States as a whole.

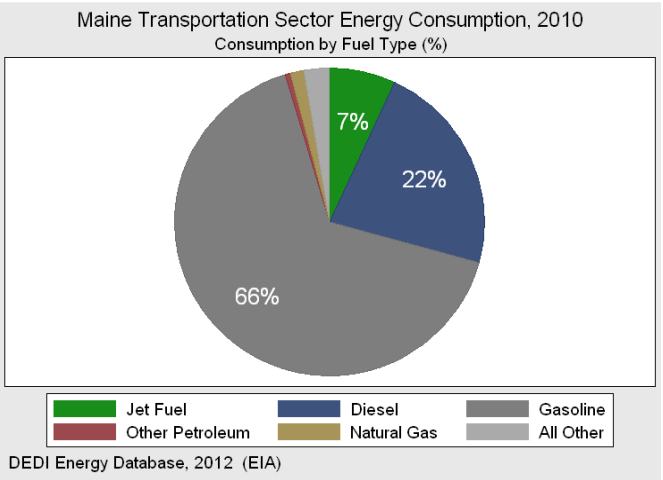


In 2010, net industrial energy consumption in Maine was 126,375 billion Btu, an increase of 5% from 2009. Accounting for energy use across fuels or resources, wood products represented the largest amount of industrial energy consumption in 2010. (Note: net energy consumption does not include the associated energy losses of electricity generation and transmission.)



Net commercial energy consumption in Maine fell by 2% in 2010 to over 43,449 billion Btu. During 2010, petroleum constituted the largest portion of commercial energy consumption and displayed a decrease of 7% compared with 2009. (Note: Net energy consumption does not include the associated energy losses of electricity generation and transmission).





Net residential sector energy consumption was 59,446 billion Btu in Maine in 2010. This amount was a decrease of 6% compared with 2009. Overall, residential energy consumption was led by petroleum use in 2010. (Note: net energy consumption does not include the associated energy losses of electricity generation and transmission.)

In 2010, the transportation sector of Maine consumed 125,881 billion Btu of energy commodities. This total reflected an increase of 2% in transportation energy consumption compared with the previous year. Unsurprisingly, gasoline was the largest source of transportation sector energy consumption in 2010.

Energy Intensity

Maine ranked 44th lowest nationally for commercial energy consumption per capita in 2010, a decrease of 1% compared with 2009.

Maine's residential sector consumed 60 Million Btu of energy per capita in 2010, a decrease of 4% from 2009. Maine ranked 43rd lowest by state. Industrial energy consumption per capita in Maine was 23rd highest in the country in 2010. Compared with 2009, industrial energy use per capita rose by 5%. Transportation energy consumption per capita in Maine rose by 1% in 2010. Overall, Maine ranked 23rd highest in the country for this metric.

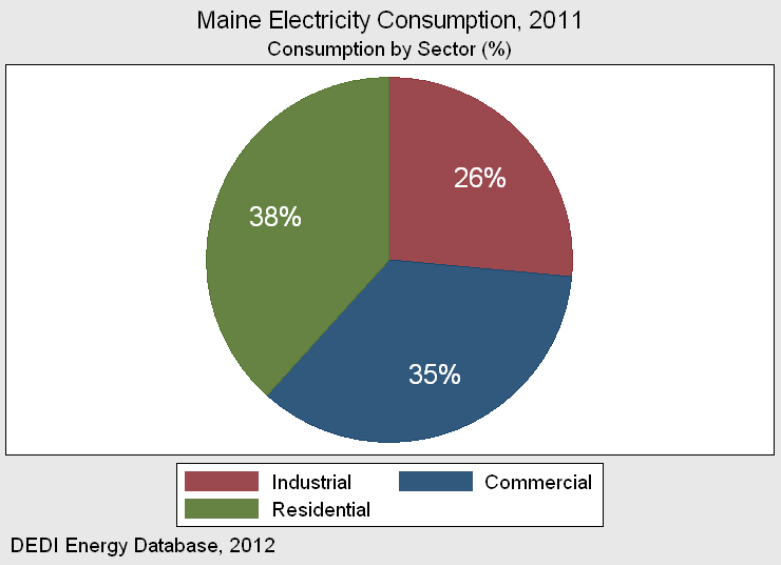
Maine ranked 23rd highest for energy consumption used to produce one dollar of state GDP in 2010. This measurement rose by 2% compared with 2009. Maine's commercial sector ranked 34th lowest for the ratio of energy use to state GDP dollar in 2010, an increase of less than 1% from 2009. Industrial energy consumption per dollar of state GDP in Maine was 21st highest in 2010. Compared with 2009, industrial energy intensity rose by 6%. Transportation sector energy intensity per state GDP dollar in Maine rose by 3% in 2010. Overall, Maine ranked 15th highest in the country for this metric.

Due to its energy-intensive forest products industry, Maine is the only New England State in which industry is the leading energy-consuming sector. Approximately 75 percent of Maine's households use fuel oil for heating, which is the highest percentage in the United States. Concerns over energy prices, use, and emissions are growing at both the national and state levels. These issues are especially pressing in colder regions of the nation, such as in Maine, which require substantial energy inputs for home heating.

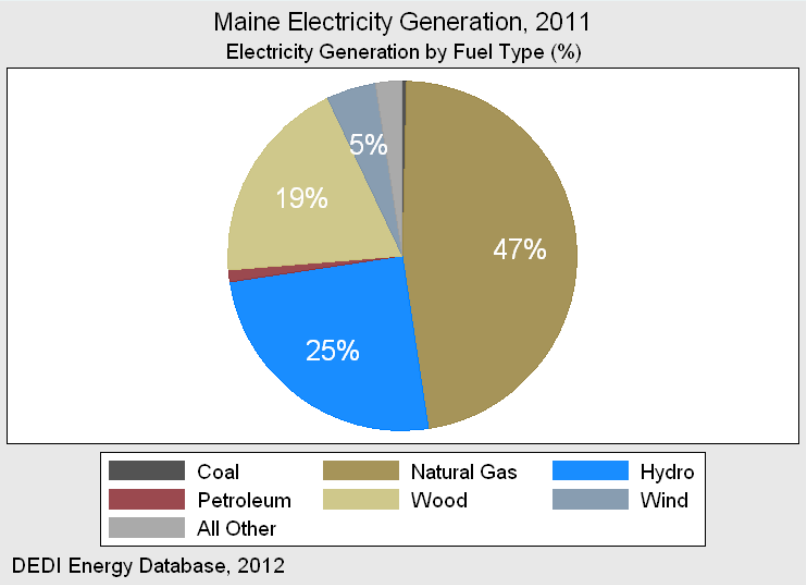
Although Maine has no fossil fuel reserves, it has significant renewable energy potential. The State's numerous rivers, forests, and windy areas provide the potential for hydroelectric, wood-fired, and wind-powered energy generation.

Electricity

Maine has a deregulated competitive market for electric power. Electricity consumption has been growing at 1.6% per year, which is about one-third lower than the national average. At the same time, population is growing at only 0.6% per year, a little higher than half the national average. Maine has significant non-hydro renewable energy resources, especially wind and biomass. The state ranks third in electricity production from biomass.



In 2011, citizens, institutions, and firms in Maine consumed 11,411 gigawatt-hours of electricity, not including anything behind the meter. Compared with 2010, total electricity consumption fell by 1%. Dividing electricity consumption by economic sector, residential customers were the largest consumers of electricity in Maine in 2011.



Electric power facilities in Maine generated over 15,778 gigawatt-hours of electricity in 2011. The use of natural gas represented the largest portion of this electricity, accounting for 7,319 gigawatt-hours. Overall, electricity generation fell by 7% versus the previous year.

Electricity Intensity

At 8.6 MWh, Maine ranked 27th nationally for total electricity consumption per capita in 2011, an decrease of 1% from 2010. Residents of Maine used on average 3.3 MWh of electricity in 2011. Representing an increase of less than 1%, this amount ranked Maine 29th lowest by state. Industrial electricity consumption per capita in Maine was 5th highest in 2011. Versus 2010, industrial electricity consumption per capita fell by 2%. Maine's commercial electricity consumption per capita fell by 2% in 2011 to 3 MWh. Overall, Maine ranked 12th highest in the country for this metric.

Electricity Generation

Net electricity generation in Maine is one of the lowest in the United States. As in Massachusetts, Rhode Island and Connecticut, natural gas has become the dominant fuel for power generation in Maine; since 2001, it has accounted for at least one third of generation.

Renewable energy sources, mainly wood / wood waste and hydroelectric, account for about half of Maine's net electricity generation. Maine is one of the leading producers of electricity from wood and wood waste in the United States. Non-hydroelectric renewable

energy sources (including wood and wood waste) account for a larger share of net electricity generation (about one-fourth) in Maine than in any other State. Residential electricity use in Maine is quite low compared with the rest of the U.S., in part because air-conditioning demand is low during the cool summer months and because very few households use electricity as their primary energy source for home heating.

Fuel Sources for Electric Power Generation

Natural Gas	33%
Renewables	30%
Hydroelectric	22%
Petroleum	12%
Coal	2%
Other	1%

Source: EIA SEDS Database 2008

Pursuant to statutory requirement, Maine's Public Utilities Commission adopted a renewable portfolio standard in September 1999, requiring that at least 30 percent of all retail electricity sales come from renewable sources. In June 2006, Maine adopted another renewable portfolio goal to increase renewable energy capacity by 10 percent between September 1, 2005 and 2017. In 2007, Maine declared its renewable capacity goal a mandatory target.

Maine's Power Plant Emissions

The last major amendments to the Clean Air Act were implemented in 1990. These amendments focused on National Ambient Air Quality Standards and the mechanisms which would ensure compliance with emission reduction targets. Subsequently, the emission of sulfur dioxide (SO2) and nitrogen oxides (NOx) from electric generating plants were regulated and scheduled for reduction. The dual display of electricity generation and regulated emissions indicates that over time, though electricity demand and generation have increased, the release of targeted pollutants has actually decreased. Therefore, both the aggregate emission as well as intensity of emission per gigawatt-hour of criteria pollutants, such as sulfur dioxide and nitrogen oxides, have been decreasing nationally since 1990. The reductions have been made through a combination of fuel switching and the installation of pollution mitigation systems at power plants.

- Sulfur dioxide is a highly reactive gas and major pollutant that is monitored and regulated at the State and Federal level. In 2009, the electric power sector of Maine emitted 32,926 metric tons of sulfur dioxide, representing an increase of 26% compared with 2008. Overall, the electric power sector of Maine has decreased sulfur dioxide emissions by 37% since 1990.

- Nitrogen oxides are a group of highly reactive regulated pollutants. In 2009, the electric power sector of Maine emitted 12,397 metric tons of nitrogen oxides, representing an increase of 15% compared with 2008. Overall, the electric power sector of Maine has decreased nitrogen oxides emissions by 13% since 1990.
- Carbon dioxide emssisions from fossil fuel power plants have been monitored over time at the State and Federal level. In 2009, the electric power sector of Maine emitted 4,714,269 metric tons of carbon dioxide, representing a decrease of 11% compared with 2008.

Maine's Electric Grid

Bulk electric power transmission in Maine and throughout New England is primarily handled by a 345 kV (345,000 volt) and associated 115Kv (115,000 volt) transmission system, which interconnects to systems in Eastern Canada and the rest of North America to the west.

The Central Maine Power (CMP) transmission system is responsible for carrying bulk electricity from generators throughout Maine and the rest of New England and Canada, and distributing this power to users throughout Maine. It consists of high capacity power lines, capacitors, transformers, circuit breakers and other equipment used for transmitting, switching, and controlling electrical power. The bulk transmission system in CMP's service territory operates at two voltage levels: 345kV and115kV.

The 345kV system is the backbone of the bulk power transmission system. The 345kV transmission lines carry more power than any other lines in the entire system. They are the main connection between CMP and bulk power systems to the north, in New Brunswick, Canada, and to the south, in New Hampshire and Massachusetts. The 345kV transmission lines are responsible for delivering electricity from New Brunswick to the rest of the New England Power Pool (NEPOOL) and vice versa. The 345kV substations in Maine are Chester, Orrington, Maxcys, Mason, Surowiec, Buxton, Maine Yankee (Wiscasset), South Gorham, and W. F. Wyman. By operating transmission lines at such a

high voltage, line losses and voltage drops can be minimized while the lines deliver large amounts of energy to customers throughout the system.

The 115kV system is the workhorse of the transmission system. It is responsible for transmitting power from the 345kV autotransformers and intermediate-sized generation throughout the entire service territory. The 115kV transmission lines are the main arteries for electricity; carrying it to and from every geographical area CMP serves. Many large industrial customers are served directly from the 115kV transmission system. CMP currently operates over one thousand miles of 115kV transmission lines, connecting over 60 substations. There are also five 115kV lines that connect CMP to neighboring utilities to the north (Bangor Hydro Electric Company) and south (Public Service Company of New Hampshire).

CMP's 345kV transmission system was built and put into service in 1971. Since then power consumption has more than doubled. In recent years, both CMP and ISO-NE have identified certain reliability issues with the 345kV system that need to be assessed and addressed.

Bangor Hydro-Electric (BHE) has dropped its hydro, but the company still has plenty of electricity. As part of the restructuring of the electric utility industry in the state of Maine, BHE has shed its generating facilities, including its hydroelectric projects, to focus on distribution and transmission. The regulated utility serves 117,000 customers in six counties in eastern and east coastal Maine. BHE is a subsidiary of Canada's Emera, the parent company of electric utility Nova Scotia Power. It is a member of the regional transmission organization New England Power Pool (ISO New England).

In response to reliability concerns, Bangor Hydro Electric recently constructed a second 345kV transmission line, called the Northeast Reliability Interconnect (NRI), between New Brunswick and Orrington, Maine. Given the growing demands on the CMP 345kV system, the additional Bangor Hydro Electric line, and the increasing issues identified by CMP and ISO-NE, the time has come to comprehensively evaluate the bulk power system in Maine and determine what investments should be made to ensure reliable service for the future.

Maine Public Service Company operates as an investor owned electricity transmission and distribution company. It supplies electric power generated from wind and other renewable energy projects for customers in Northern Maine. The company serves approximately 36,000 customers operating in agricultural and forest products businesses, as well as

residential, commercial, and industrial customers. The company is headquartered in Presque Isle, Maine and operates as a subsidiary of Maine & Maritimes Corporation.

Electricity Infrastructure and Distribution

Electric power in Maine is sold by largely deregulated power providers in competition with one another. The delivery of power over transmission and distribution lines is provided by distribution companies and regulated by the PUC. Maine distribution companies include three investor-owned utilities and ten consumer-owned utilities. Significant amounts of electricity are imported over international federally regulated international transmission lines from New Brunswick and exported to the rest of New England over federally regulated interstate transmission lines into New Hampshire.

Maine's Transmission and Distribution (T&D) utilities are required by law to provide safe, reasonable, and adequate facilities and service. As a result, they are responsible for system security and for system restoration during emergency events. T&D system emergency plans are on file with the PUC. Access to generation facility security plans is at the discretion of the generation company.

Except in the northeastern part of the state, Maine T&D utility systems are part of the New England Power Pool (NEPOOL). The Independent System Operator for NEPOOL (ISO New England) is responsible for regional system reliability and has an established procedure for when the regional system is faced with energy shortages. One of the first steps of the procedure, known as OP-4 (Operating Procedure 4) includes voluntary conservation measures and emergency power purchases. The next actions involve reduced operating reserves and voltage reductions.

The final actions are radio and TV appeals for conservation (power warnings), and in extreme circumstances ISO-NE may request that state governors personally reinforce the message. ISO New England also has a confidential system in place to communicate high-security messages to all power plants, many participants, and neighboring control centers.

Maine T&D utility systems in northeastern Maine are not directly connected to NEPOOL, but operate as part of the Maritimes Control Area and both generates power locally and receives power through transmission facilities owned by New Brunswick Power Company.

As a result, market conditions in Northern Maine can vary substantially from market conditions elsewhere in New England.

Petroleum

Maine imports 100 percent of its oil. The price and supply of oil here are driven not only by the market forces of supply and demand that influence other commodities, but also by U.S. domestic and foreign policy decisions in combination with the policies of oil producing nations. Other market forces have a large impact on the petroleum industry, including product seasonality, curtailments (such as refinery outages), and acts of nature. World oil and gas markets are complex and so energy emergencies that involve petroleum products are complex, requiring states to work with multiple organizations to develop effective responses.

Coastal ports, including Portland, Searsport, and Calais, receive petroleum products from abroad. Although Maine has no refining capacity, the Port of Portland receives crude oil shipments that it then sends via pipeline to refineries in Quebec and Ontario. Maine's per capita petroleum consumption is high due to the widespread use of fuel oil for home heating during the long, cold winters. The annual consumption of #2 heating oil and kerosene in Maine is roughly 1,009 gallons per household and 427 million gallons statewide. About three-fourths of Maine households use fuel oil as their primary energy source for home heating, a higher share than in any other State.

Maine, along with much of the U.S. Northeast, is vulnerable to distillate fuel oil shortages and price spikes during winter months. In January and February 2000, distillate fuel oil prices rose sharply when extreme winter weather increased demand unexpectedly and hindered the arrival of new supply, as frozen rivers and high winds slowed the docking and unloading of barges and tankers. In July 2000, in order to reduce the risk of future shortages, the President directed the U.S. Department of Energy to establish the Northeast Heating Oil Reserve, described below. The Reserve gives Northeast consumers adequate supplies for about 10 days.

Fuel Oil / Heating Oil Infrastructure and Distribution

The Northeast gets almost half its fuel oil supply as a refined product from the Gulf Coast via the Colonial pipeline to Linden, New Jersey. Refineries in Philadelphia and New Jersey send oil to Boston and New York harbors. From there, waterborne deliveries are made to Maine harbors via coastal terminals, including those in Portland, South Portland, Searsport, Bucksport, Yarmouth and Bangor. Maine terminals also receive roughly 50 percent of its products by truck and marine transportation from an Irving refinery in St. John, New Brunswick. Maine has pipeline capacity that carries crude oil to refineries and bulk terminals near Montreal, Quebec. Maine's fuel oil distribution system has three components: primary terminal facilities, which receive bulk loads of products; secondary, or bulk, storage facilities; and tertiary distribution facilities with local tank storage. Maine's oil distribution system and the state of local inventories depend on the petroleum industry's ability to re-supply the Northeast.

Kerosene Infrastructure and Distribution

Kerosene is trucked from terminals that are supplied by barge or tanker. Three terminals currently supply kerosene in Maine, though the mix of products stored at particular terminals can change substantially and more (or fewer) terminals may handle kerosene at different times. Kerosene supplies are variable and fluctuate from month to month.

Northeast Regional Home Heating Oil Reserve

On July 20, 2000 President Clinton directed Secretary of Energy Bill Richardson to establish a home heating oil component of the Strategic Petroleum Reserve (SPR) in the Northeast to help protect the region from possible fuel shortages. The US is now storing 2 million barrels of heating oil in the reserve which is intended to provide emergency relief from weather-related shortages for approximately 10 days. This is the time needed for ships to bring heating oil from the Gulf of Mexico into New York Harbor and from suppliers in Venezuela and Canada to bring oil into New England. The Reserve's storage terminals are located in Perth Amboy, New Jersey, and Groton and New Haven, Connecticut.

Although heating oil shortages never materialized during the 2000-01 winter, the existence of the Northeast Home Heating Oil Reserve (NEHHOR) provided an important safety cushion for millions of Americans. Recognizing this, the Bush Administration established the Reserve as a permanent part of America's energy readiness effort. On August 6, 2001

the U.S. Department of Energy announced their approval of relocating 250,000 barrels of the NEHHOR to the Motiva terminal in Providence, RI. Accordingly, the DOE issued a statement. “Stockpiling a portion of our heating oil inventory in Providence gives us a third geographic location from which we can distribute fuel to homeowners and businesses in the event of a supply shortage. Providence is especially advantageous because it extends our distribution capabilities into the Boston area and gives us additional truck and marine loading options.” It is unclear, however, if the NEHHOR would be available to Maine during an emergency, due in large part to Jones Act restrictions on tankers.

Natural Gas

Maine consumed 77,574 million cubic feet of natural gas in 2010, according to the latest data available from the Energy Information Administration (EIA). Natural gas is used in the residential, commercial, and industrial sectors. Annual consumption of natural gas for home heating is roughly 69,400 cubic feet per household. Only four percent of Maine’s population heats primarily with natural gas. Residential consumption includes space heating, water heating, cooking, and clothes drying. Natural gas is also used in the state for generating electricity at several natural gas-fired combustion-turbine power plants. Commercial applications include space and water heating, cooking, food processing, air conditioning, refrigeration, and incineration. Industry uses natural gas for boiler fuel, space heating, and incineration, as well as in numerous industrial processing applications such as food preparation, ceramic and cement kilns, metal melting, heat treating, and glass manufacturing.

Maine and the rest of New England have become increasingly dependent on natural gas to generate electricity and consequently increased pressure has been put on natural gas supplies. Decreasing Canadian supplies have driven many companies to propose construction of liquefied natural gas (LNG) facilities in Maine, New England, and Canada to meet the region’s growing demand for natural gas. Canaport LNG is the first LNG receiving and regasification terminal in Canada and is located in Saint John, New Brunswick. The LNG terminal began operations in June 2009 with its first shipment of LNG from Trinidad & Tobago. The Canaport LNG has a maximum send-out capacity of 1.2 billion cubic feet (BCF) or 28 million cubic meters of natural gas per day and the natural gas is delivered through the Brunswick Pipeline to Maritimes Northeast Pipeline in Baileyville, Maine.

Furthermore, because of the electric grid's dependence on this fuel, natural gas shortages take on added importance. The natural gas business structure is very complex. Gas production resources, transmission systems, and local distribution systems are usually owned by different companies. The "gas utility" from which most customers buy product is often a Local Distribution Company (LDC) that may not have a contract that assures delivery of out-of-state gas supplies through interstate transmission pipelines. For this reason, an LDC has a more limited range of options in reacting to a natural gas emergency than a vertically integrated utility does. But LDCs are required by law to have emergency plans to cope with gas infrastructure disruptions, and federal pipeline safety rules apply to both LDCs and interstate pipelines.

Maine receives its natural gas by pipeline, mostly from Canada, and ships over one-half of its natural gas receipts to the Boston area via New Hampshire. With the expansion of the Maritimes and Northeast Pipeline and the new LNG facility in New Brunswick, Canada, Maine has increased its supply capabilities to the Northeast markets. Maine is at least 85% dependent on the interstate pipeline network for its natural gas supply.

Natural Gas Infrastructure and Distribution

Because of system design, disruptions in delivery of natural gas for heating are less frequent than disruptions in electricity. Most local natural gas systems have multiple interconnections or rerouting capabilities buried underground. But when disruptions do occur, substantial risk to health and safety is possible. A break in a natural gas pipeline can cause an explosion or fire. A total loss of gas supply in a region can take weeks or months to repair and restore as crews must purge air from the entire system, re-pressurize it, and then manually relight all of the customers that have been shut off. A loss of gas in the winter can have immediate serious health impacts. Most of the natural gas supplies used in the U.S. originate in the southern states of Texas, Louisiana, New Mexico, Oklahoma, Wyoming, and in the Gulf of Mexico as well as in Alaska and Canada. Most of the gas consumed in Maine originates from either western Canada or Sable Island. Gas is imported through high-capacity, high-pressure pipelines owned by interstate gas transmission companies. Within a state, gas is provided by a local distribution company (LDC) that operates

intrastate and local service lines. An LDC may also rent or own gas storage facilities that are a crucial component of the gas supply system.

Two interstate natural gas pipelines cross the state of Maine:

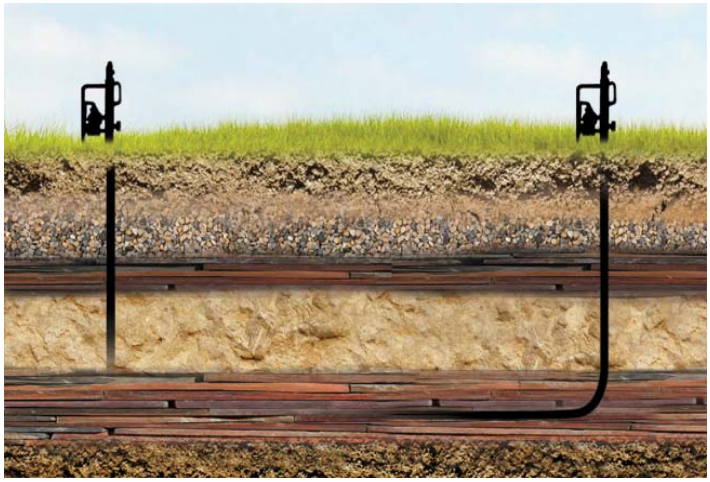
1. **The Maritimes & Northeast Pipeline (M&NE)** runs through eastern, central, and southern Maine from Calais to Berwick. This regional international pipeline transports eastern Canadian gas from Sable Island, through Maine, and on to southern New England. Gas from this pipeline is accessed in Maine at two locations—one in the greater Bangor area and the other in Westbrook. This line was upgraded to double its throughput capacity to carry liquefied natural gas (LNG) volumes from the Canaport LNG import facility in New Brunswick to U.S. markets to our south. (See Appendix L) Canaport LNG is able to supply 20% of the natural gas needs of the northeast US as well as Canadian needs. Canaport LNG's receiving and re-gasification terminal is located in Saint John, NB and is the first LNG terminal in Canada, sending out natural gas to both Canadian and US markets. Liquefied natural gas (LNG) arrives by ship to Saint John in specially designed LNG tankers and is offloaded by being pumped through pipes into LNG storage tanks at the Canaport LNG terminal. The LNG is restored to its original gaseous form through a process called re-gasification. The natural gas is then distributed via the Brunswick Pipeline for use as fuel in Canada and US markets. There it is used for home heating and cooking, generating electricity as well as many other industrial purposes.

2. **The Portland Natural Gas Transmission System (PNGTS) Pipeline** runs through western Maine, transporting western Canadian gas from an interconnection with the Trans Canada pipeline in Quebec to the New England market. A smaller lateral line provides gas service to Maine power plants located in Rumford and Jay. This line joins the M&NE line in Westbrook. Unitil provides natural gas service to approximately 25,000 customers in Greater Portland, Lewiston/Auburn and Kittery. Unitil is headquartered in Hampton, New Hampshire. Its rates are composed of two components – its delivery (or transportation) rates and its gas supply rates. Bangor Gas Company, LLC serves customers in Bangor, Brewer, Veazie, Orono and Old Town. Bangor Gas is a wholly owned subsidiary of Energy West and obtains its gas supply via the Maritimes pipeline. The company offers sales service to all classes of customers and transportation-only service to commercial and industrial customers. Bangor Gas has a monthly cost of gas rate and a budget payment plan. Maine Natural Gas currently serves customers in Windham, Gorham, Bowdoin, Topsham and Brunswick. Maine Natural Gas is a subsidiary of Iberdrola, an energy company headquartered in New York. The company offers transportation-only service to all commercial and

industrial customers and sales service to all classes of customers. It has a monthly cost of gas rate and offers a fixed price option for the cost of gas. (See Appendix K for PNGTS pipeline map.)

The regional supply of natural gas is augmented by the infusion of LNG delivered by ship to a Boston area terminal where a portion is transported into Maine by truck to be introduced into the pipeline system. According to the Northeast Gas Association, LNG provides as much as 25 percent of the daily peak supply in winter and about 15 percent of New England's total gas supply in 2000. Three local distribution companies provide gas supply to central and southern portions of the state using natural gas delivered via one of the transmission pipelines.

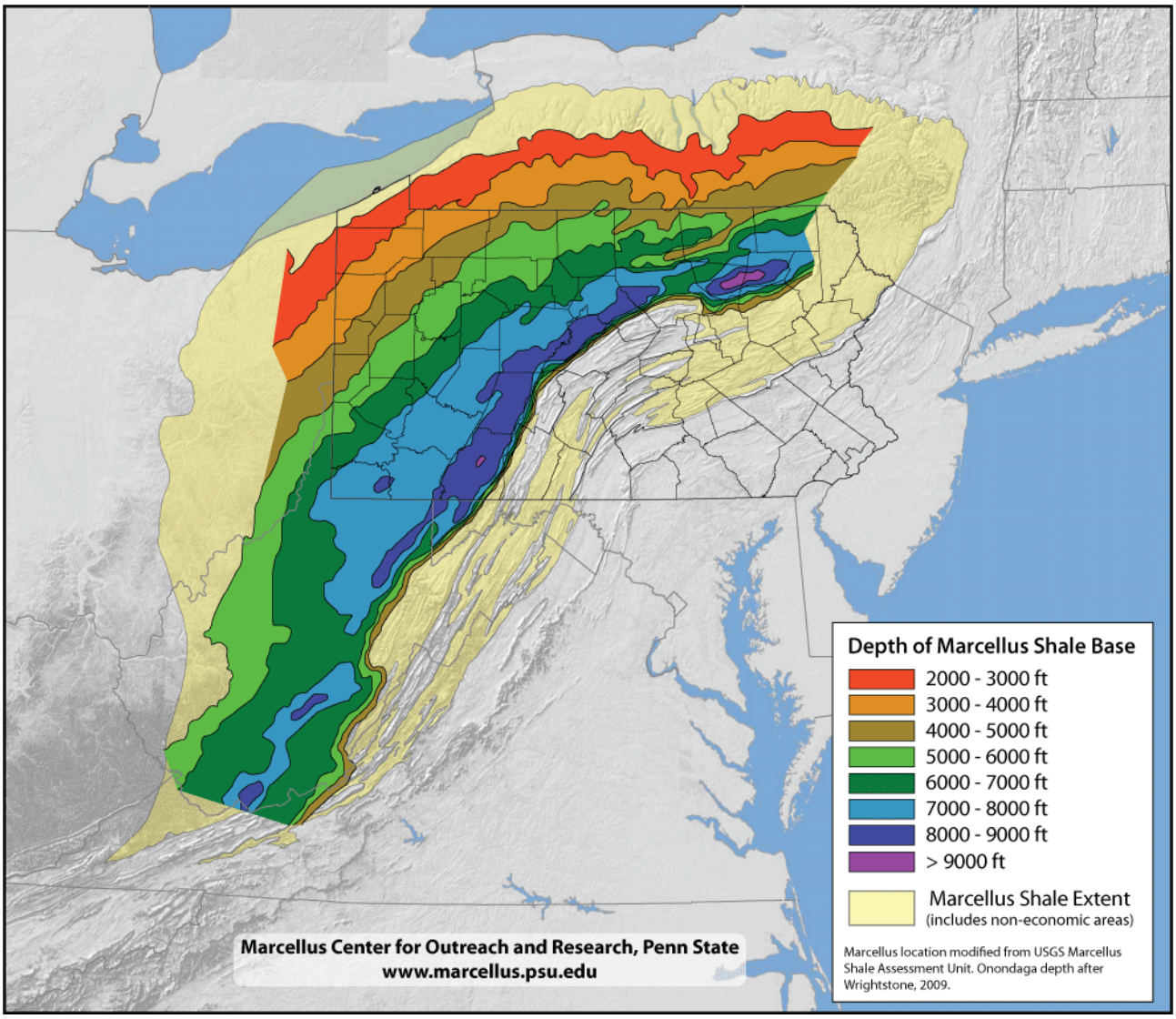
Natural Gas Development Potential of Marcellus Shale



The Marcellus shale spans a distance of approximately 600 miles, running from the southern tier of New York, through the western portion of Pennsylvania into the eastern half of Ohio and through West Virginia. The area extent of the Marcellus shale is about 54,000 square miles, which is slightly larger than the state of Florida. The shale is extremely variable in thickness, ranging from a few feet to more than 250 feet in thickness, and generally becomes thicker to the east. Potentially, because of its proximity, the development of the Marcellus Shale may play a very important role in Maine's energy future. Natural gas is widely viewed as a critical fuel while facilitating the expanded use of nuclear, solar, wind, and biomass resources.

Development of the Marcellus Shale is now well underway in Pennsylvania and West Virginia. Promising Marcellus prospects also exist in upstate New York. It is believed that there is a very large amount of natural gas embedded in this shale and even with assumptions on recovery rates that are relatively low, the recoverable reserves could be as large as 489 trillion cubic feet, which would make the Marcellus the second largest gas field in the world behind the super-giant South Pars field in Qatar and Iran. At current gas prices, which are relatively low, the value of recoverable reserves in the Marcellus is roughly two trillion dollars.

The 2009 map presented below was created by Penn State and shows the magnitude and breadth of the Marcellus Shale deposit.



Propane

Propane fuel is utilized in the residential, commercial and industrial sectors of Maine's economy. In the residential sector, propane is used for space heating, water heating, and cooking, especially in rural areas

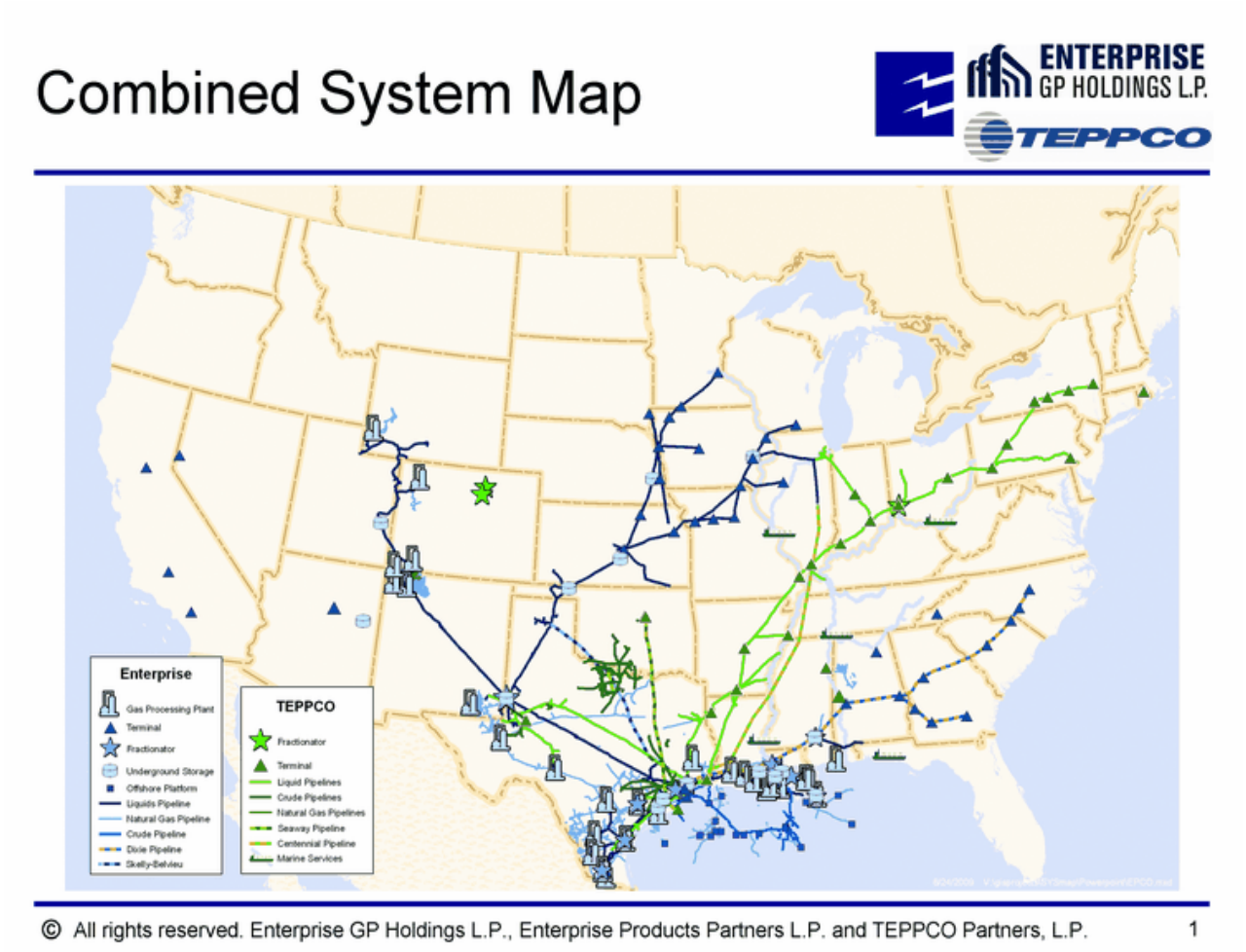
where natural gas is not available. Industrial applications include forklift fuel, boiler fuel, and kiln fuel. The sale of propane is through numerous independent distributors, and the price of propane is unregulated. Propane distributors are dependent on out-of-state supplies of propane.

Approximately 26,245 Maine households (5.5 percent of the population) use propane as a primary source of heat. Many businesses, including restaurants, big-box retail stores, light manufacturing enterprises, greenhouses, chicken and tomato farms, nursing homes, and hospitals also use propane. During the last decade, Maine's propane consumption has increased, with February 2006 usage at 337,000 gallons per day. Estimates of Maine's current propane consumption data indicate that 450,000 gallons per day is typical in the winter. In Maine, annual consumption of propane for home heating is roughly 990 gallons per household and 58 million gallons statewide. The annual cost per household to heat with this fuel is roughly $2,772.

Propane Infrastructure and Distribution

New England receives propane by rail, sea, and pipeline. Algerian and Middle Eastern propane comes via terminals in Providence, Rhode Island, and Portsmouth, New Hampshire. The Texas Eastern Products Pipeline Company (TEPPCO) pipeline from Texas to Albany, New York, provides more supply, and outsourced Canadian propane arrives in Maine primarily by rail (See Appendix O). Seventy percent of Maine's propane arrives by rail to a depot in Auburn. Most of this product is delivered by Canadian National, CSX, and Maine Montreal and Atlantic (MMA) railroads. Product comes from refineries in Canada and is provided by an affiliate of Duke Energy named NGL Services, which acquired former Gas Supply Resources in May 2001. The Denver-based company is also a general partner of the TEPPCO pipeline. GSR's integrated propane terminal operation had an import terminal facility in Providence, Rhode Island and bulk supply depots in Duke Energy's Northeast network in the following locations: Montpelier, Vermont; Albany, New York; Westfield, Massachusetts; York, Pennsylvania; and Auburn and Bangor, Maine. The Auburn facility has an onsite storage capacity of 120,000 gallons, and Duke operates a joint venture with R.H. Foster in Bangor with a storage capacity of 60,000 gallons. Additional supplies arrive by truck.

The "Combined System Map" shown below illustrates the current locations and reach of Enterprise / Teppco system assets across the United States.



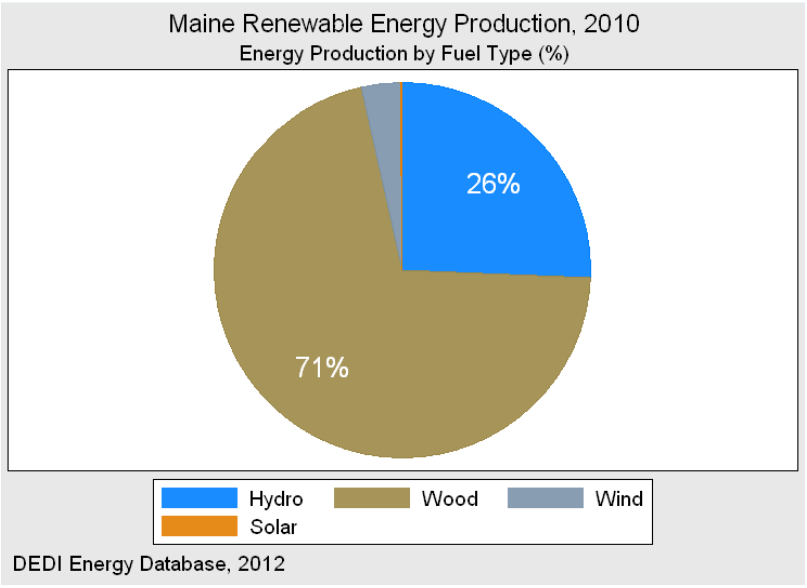
Coal

Coal consumption in Maine is miniscule. As such, coal is not considered a viable energy resource for future development in either home heating or power generation. However, rising energy demand will continue to drive up coal consumption, particularly in countries with large reserves such as the United States, China and India. 50 percent of the electricity generated in the United States is from coal. U.S. coal-fired plants have over 300 GW of capacity. Of these, approximately one-third date from 1970 or earlier, and most of the rest from 1970-1989. Only 12 coal-fired plants have been built in the United States since 1990. At current consumption rates and with current technology and land-use restrictions, the U.S. coal reserves would last well over 250 years. With

improved technologies, estimated recoverable coal reserves, at current consumption rates, are estimated to be sufficient for 500 years or longer.

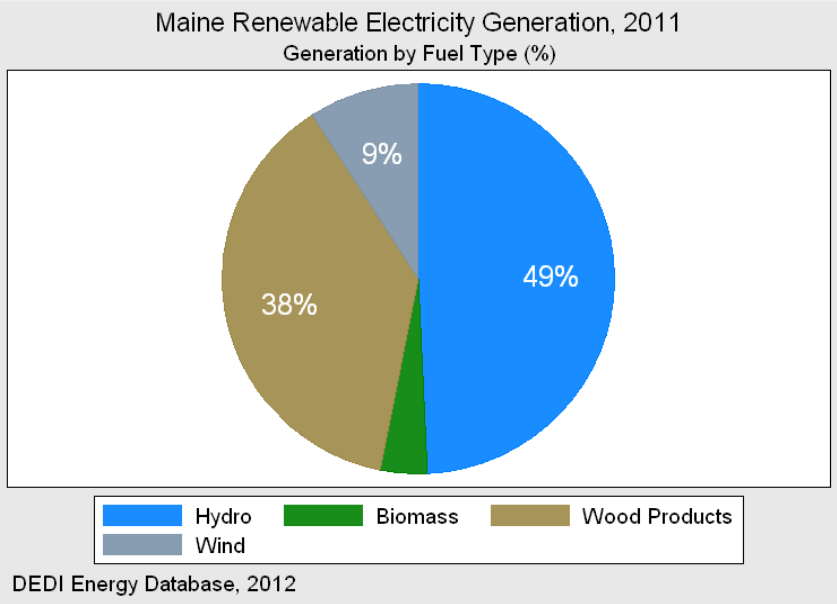
Renewable Energy Sources

Renewable sources account for almost half of Maine's net electricity generation. As mentioned previously, Maine is one of the top U.S. producers of electricity from wood and wood waste. Non-hydroelectric renewable energy sources account for a larger share of net electricity generation (about one-quarter) in Maine than in any other State.



In 2010, renewable energy production in Maine was 145,302 billion Btu, an inecrease of 4% from 2009. Dividing this production by fuel type, wood & biomass resources accounted for the largest amount of energy production in 2010.

Describing renewable electricity generation by fuel type or commodity, the production from hydroelectric facilities represented the largest portion of renewable electricity generation in Maine in 2011. Compared with 2010, the electrical output of hydroelectric facilities displayed an increase of 2% in 2011. (Total biomass generation is divided between wood products - labeled Wood - and other biomass resources - labeled Biomass - such as landfill gas).



- Biomass Energy

Maine is the United State's most heavily forested state with 90% of its land classified as forestland. As wood biomass derived fuels technology moves forward, Maine's forests provide a tremendous potential source of renewable energy. Biomass energy facilities also referred to as wood waste facilities, combust biomass to produce renewable electricity. Biomass may include: woodchips, sawdust, bark, tree trimmings, agricultural waste and wood recovered from construction demolition activities. Maine has 2.2 million dry tons of biomass available each year that could be used to generate about 400 MW of electricity. (See Appendix D)

- Solar Energy

For many sites in Maine, solar energy is a cost-effective way to heat water, heat a home or business, and generate electricity. Solar energy encompasses a range of technologies, but there are two basic types: 1) Solar Thermal Systems collect the sun's heat and use it for domestic hot water or space heating; 2) Photovoltaic (PV) Electrical Systems use panels containing semiconductor materials to convert sunlight directly to electricity. Maine has enough solar resources to produce 4,000

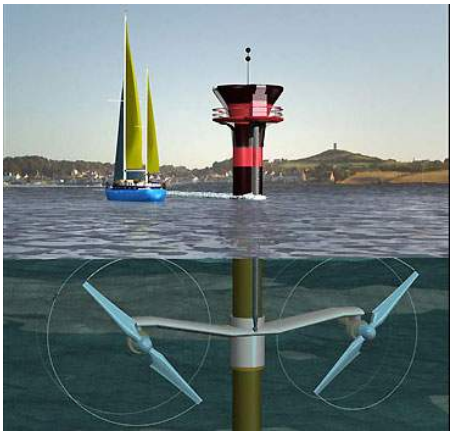
to 5,000 watt-hours (Whr) per square meter using photovoltaic systems and 3,000 to 4,000 Whr per square meter using concentrating solar power systems. This means that devoting just 1 square mile in Maine to solar power can provide enough electricity for about 1,100 households each year.

- Wind Energy

Wind turbines, like the windmills that have been used for centuries, can be a cost-effective source of electricity in certain areas. Because wind turbines must be in a good airstream (generally at least 60 feet from the ground) to be effective, they may not be suitable for urban or small-lot suburban homes. And unlike coal, oil or gas, wind power is a local Maine product. Maine has an onshore wind industry that is experiencing significant growth.

In Maine, there is estimated a total 15.6 GW of wind potential in shallow water, 6 GW of which are commercially viable when environmental and socioeconomic limits are taken into account. Maine is taking many steps to become a leader in deepwater offshore wind power, already leading in research, testing, and development. The Gulf of Maine has nearly 10% of all US deep water wind resources. The state has set a goal of developing 5 GW – or 5,000 megawatts (MW) – of deepwater wind by 2030, starting with a 25 MW demonstration project over the next several years. (See Appendix F.)

- Tidal Energy



Ocean energy is considered key to Maine's future. The State leads the nation in offshore wind, tidal and wave resources. Tidal power is a form of hydropower that converts the energy of tides into electricity. Tidal stream generators (or TSGs) make use of the kinetic energy of moving water to power turbines, in a similar way to wind turbines that use moving air. Tidal barrages, essentially dams across the full width of a tidal estuary, make use of the potential energy in the difference in height between high and low tides. Relatively untapped and unexplored before a 2005 study by the Electric Power Research Institute (EPI), Maine's tidal power

potential has long provoked the interest of politicians, engineers, entrepreneurs, developers and dreamers. Most recently, the tidal energy system in Eastport, Maine, began generating grid-compatible electricity in August 2010. (See Appendix E for a listing and description of "Maine Tidal Energy Projects")

Renewable Energy, Energy Efficiency Programs & Incentives

Maine has the following state-level policies and incentives in place that support the development of renewable energy and energy efficiency technologies. (Source: the Database of State Incentives for Renewable Energy and Energy Efficiency.) The Efficiency Maine Trust was created to administer all energy efficiency and renewable energy programs in the State of Maine. It is an independent, not-for-profit, quasi-state agency governed by a stakeholder board of directors. While the Governor's Energy Office provides the policy direction for the State, Efficiency Maine implements the strategies to help save Maine consumers money through energy efficiency and alternative energy programs. The Maine State Housing Authority works with both agencies to ensure that lower- and moderate-income Maine citizens can heat their homes, pay their electric bills and benefit from energy improvements at little or no cost to them. All three agencies are working together to reach goals of weatherizing 100% of Maine's housing stock and 50% of businesses by 2030.

- **Building energy codes for energy efficiency** – The Energy Efficiency Building Performance Standards (EEBPS) are statewide minimum requirements that covered all new construction and additions to existing buildings must satisfy. Exceptions include single-family homes built by an owner-builder (which includes anyone supervising the construction of that person's single-family dwelling or a general contractor hired to supervise the construction) and log homes. As a result, the code only affects about 5% of new residential construction. The commercial requirements apply to all new commercial and institutional construction. Manufacturing facilities are exempt. Legislation enacted in April 2008 (H.B. 1619) established the Technical Building Codes and Standards Board and required the board to adopt the Maine Uniform Building and Energy Code, a new energy code for buildings, setting the 2009 versions of the IECC, IBC, IRC, IEBC and ASHRAE 90.1 as the mandatory building code standards for residential and commercial buildings statewide. Beginning December 1, 2010, the code is enforced in cities and towns that have more than

2,000 residents and that have adopted any building code by August 1, 2008. Effective July 1, 2010, the Maine Uniform Building and Energy Code replaces the state's model energy code.

- **Grants for renewable energy** – Maine's Renewable Resources Fund supports small-scale community demonstration projects designed to educate communities on the value and cost effectiveness of using natural resources to generate clean electricity. Maine-based nonprofit organizations that qualify under the federal Internal Revenue Code Section 501 (c)(3), consumer-owned electric cooperatives, quasi-municipal corporations and districts, community based nonprofit organizations and community action programs using renewable energy technologies.
- **Property Assessed Clean Energy Program (PACE)** – In Maine, property owners take out a low-interest PACE loan to pay for cost-effective energy improvements. Many homeowners lack the financial means necessary to pay the upfront costs, which typically range from a few thousand dollars to $15,000 or more. Homeowners can be assured that if they move before the loan is paid off, the loan can be passed to the next homeowner. While Maine cities and towns now have the authority to establish a PACE program, Efficiency Maine's Loan Fund provides the capital for the initial phase of the loan program. The revolving loan fund is intended to keep going long after the initial federal grants funds are exhausted. Repayment of PACE loans will generate a continuing revenue stream to keep interest rates low and ensure the loan fund is replenished at no cost to Maine taxpayers. The goal is to make the revolving loan fund sustainable and available for future participants to lower their energy bills.
- **Rebates for energy efficiency** – Maine has an efficiency rebate program for businesses and government facilities offering both prescriptive and custom incentives. Maine also has a residential rebate program for lighting.
- **Rebates for renewable energy** – Maine has a rebate program for solar energy systems installed at homes or businesses.
- **Renewable portfolio standard for renewable energy** – Maine requires retail electricity providers to obtain 30% of their power from renewable energy resources. This requirement is the highest of any state, but Maine allows existing hydropower facilities to qualify. As a result, the state already obtains more than 30% of its electricity from renewable energy. Maine also has a

renewable portfolio standard to increase *new* renewable energy capacity by 10% by 2017.

Maine Renewable Energy Incentive Programs –

- **Community Based Renewable Energy Production** – In June 2009, Maine established the Community-based Renewable Energy Pilot Program. This program is intended to encourage the development of locally owned, in-state renewable energy resources. Legislation mandates that up to 50 megawatts (MW) of generating capacity (DC) will be permitted under the program, and individual participants may not exceed 10 MW. Of the 50 MW cap, 10 MW must be reserved specifically for small program participants (with generating capacity less than 100 kW) or for participants located in a service territory of a cooperative transmission and distribution utility. To be eligible for incentives, a generating facility must be 51% locally owned, use renewable energy resources (solar, wind, hydro, certain biomass, fuel cells, and tidal), be no larger than 10 MW in generating capacity, and be located in the State. Program participants will have a choice of one of two following incentive options: 1) Long-term contracts or 2) Renewable energy credit multiplier.

- **Net Energy Billing** – All of Maine's electric utilities -- investor-owned utilities (IOUs), consumer-owned utilities (COUs, which include municipal utilities and electric cooperatives) -- must offer net energy billing (net metering) for individual customers. Net metering is available to owners of eligible, qualified facilities, including facilities generating electricity using fuel cells, tidal power, solar, wind, geothermal, hydroelectric, biomass, generators fueled by municipal solid waste in conjunction with recycling, and eligible combined heat and power (CHP) systems.

- **Grants for Renewables** – The Renewable Resources Fund is an innovative approach to providing power, creating jobs and protecting the environment as it allows all electricity consumers the opportunity, personally, to support the expansion of a clean energy market in Maine.

- **Residential Lighting Program** – Efficiency Maine's Residential Lighting Program works closely with manufacturers and lighting retailers to encourage them to produce and sell energy-efficient lighting products.

- **Business Programs** – Efficiency Maine's Business Program offers cash incentives to reduce the upfront cost of projects that help you use electricity more efficiently, from new fluorescent lighting to HVAC to farm equipment.

- **Commercial Grant Program** – The Efficiency Maine Commercial Grant Program allows industrial, commercial, municipal and non-profit organizations to apply for grants of up to $50,000. Projects are funded by the federal American Recovery and Reinvestment Act of 2009 (ARRA) and are expected to meet goals that include energy savings, job creation and/or retention, and sustainable economic impact. Businesses that apply for grants are required to demonstrate the ability to provide at least 50% in matching funds. Grants are awarded based upon a competitive evaluation process.

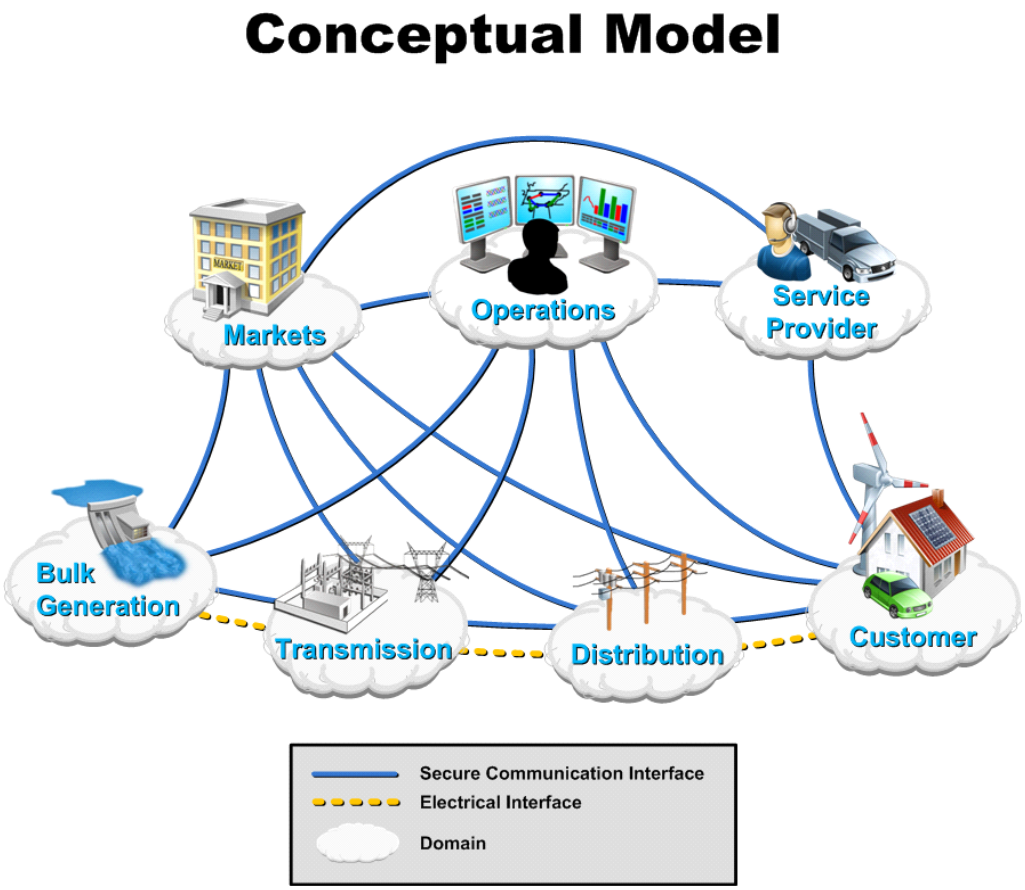
Maine Electricity Prices

Electricity usage in Maine is billed in terms of cents per kilowatt-hour of electricity consumed as well as other charges. Due to the variations between economic sectors, electric utilities, and electric power producers, the price of electricity is not uniform across Maine. As a result, each economic sector in Maine pays a different average price for the consumption of electricity.

Since 1990, the two most influential factors explaining the changes in both nominal and real electricity prices have been the type of generation portfolio developed within a state, and the price of fossil fuel inputs for the electric power sector. Specifically, these factors involve the type of generation technology (i.e. coal, gas, nuclear) used within a state, the share of each technology in supplying baseload power, and the price of the primary fossil fuel commodities.

4. Smart Grid Technology Applications

"Smart grid" is a loose term for any application of digital technology to electric transmission and distribution systems. Smart grid technology has the potential to change the way that energy is used and controlled. There are digital devices, for example, that can monitor local control centers and provide specific data for use in the operation of the bulk power transmission system.



A. Smart Grid Technologies

The many smart grid technology areas – each consisting of sets of individual technologies – span the entire grid, from generation through transmission and distribution to various types of electricity consumers. Some of the technologies are actively being deployed and are considered mature in both their development and application, while others require further development and demonstration. A fully optimized electricity system will deploy all the technology areas below. However, not all technology areas need to be installed to increase the "smartness" of the grid.

Wide-area monitoring and control - Real-time monitoring and display of power system components and performance, across interconnections and over large geographic areas, help system operators to understand and optimize power system components, behavior and performance. Advanced system operation tools avoid blackouts and facilitate the integration of variable renewable energy resources. Monitoring and control technologies along with advanced system analytics – including wide-area situational awareness (WASA), wide-area monitoring systems (WAMS), and wide-area adaptive protection, control and automation (WAAPCA) – generate data to inform decision making, mitigate wide-area disturbances, and improve transmission capacity and reliability.

Information and communications technology integration - Underlying communications infrastructure, whether using private utility communication networks (radio networks, meter mesh networks) or public carriers and networks (Internet, cellular, cable or telephone), support data transmission for deferred and real-time operation, and during outages. Along with communication devices, significant computing, system control software and enterprise resource planning software support the two-way exchange of information between stakeholders, and enable more efficient use and management of the grid.

Integrated two-way communication - Two-way communication makes the Smart Grid a dynamic, interactive, real-time infrastructure. An open architecture creates a plug-and-play environment that securely networks grid components and operators, enabling them to talk, listen and interact.

Advanced components - Advanced components play an active role in determining the electrical behavior of the grid, applying the latest research in materials, superconductivity, energy storage, power electronics and microelectronics to produce higher power densities, greater reliability and power quality.

Examples include:

- Next-generation FACTS/PQ (power quality) devices
- Advanced distributed generation and energy storage
- Plug-in hybrid electric vehicles (PHEVs)
- Fault current limiters
- Superconducting transmission cables
- Microgrids
- Advanced switches and conductors
- Solid-state transformers

Advanced control methods - Advanced control methods monitor power system components, enabling rapid diagnosis and timely, appropriate responses to any event. They also support market pricing, enhance asset management and efficient operations, and involve a broad application of computer-based algorithms.

Examples include:

- Data collection and monitoring of all essential grid components
- Data analysis to diagnose and provide solutions from both deterministic and predictive perspectives
- "Diagnosis" and subsequent appropriate action processed autonomously or through operators (depending on timing and complexity)
- Provision of information and solutions to human operators
- Integration with enterprise-wide processes and technologies

Sensing and measurement technologies - Sensing and measurement technologies enhance power system measurements and facilitate the transformation of data into information to evaluate the health of equipment, support advanced protective relaying, enable consumer choice and help relieve congestion.

Examples include:

- Smart meters
- Ubiquitous system operating parameters
- Asset condition monitors
- Wide-area monitoring systems (WAMS)
- Advanced system protection
- Dynamic rating of transmission lines

Improved interfaces and decision support - Improved interfaces and decision support will enable grid operators and managers to make more accurate and timely decisions at all levels of the grid, including the consumer level, while enabling more advanced operator training. Improved interfaces will better relay and display real-time data to facilitate:

- Data reduction
- Visualization
- Speed of comprehension
- Decision support
- System operator training

Renewable and distributed generation integration - Integration of renewable and distributed energy resources – encompassing large scale at the transmission level, medium scale at the distribution level and small scale on commercial or residential building – can present challenges for the dispatchability and controllability of these resources and for operation of the electricity system. Energy storage systems can alleviate such problems by decoupling the production and delivery of energy. Smart grids can help through automation of control of generation and demand (in addition to other forms of demand response) to ensure balancing of supply and demand.

Transmission enhancement applications - There are a number of technologies and applications for the transmission system. Flexible AC transmission systems (FACTS) are used to enhance the controllability of transmission networks and maximize power transfer capability. The deployment of this technology on existing lines can improve efficiency and defer the need of additional investment. High voltage DC (HVDC) technologies are used to connect offshore wind and solar farms to large power areas, with decreased system losses and enhanced system controllability, allowing efficient use of energy sources remote from load centers. Dynamic line rating (DLR), which uses sensors to identify the current carrying capability of a section of network in real time, can optimize utilization of existing transmission assets, without the risk of causing overloads. High-temperature superconductors (HTS) can significantly reduce transmission losses and enable economical fault-current limiting with higher performance, though there is a debate over the market readiness of the technology.

Distribution Grid Management - Distribution and sub-station sensing and automation can reduce outage and repair time, maintain voltage level and improve asset management. Advanced distribution automation processes real-time information from sensors and meters for fault location, automatic reconfiguration of feeders, voltage and reactive power optimization, or to control distributed generation. Sensor technologies can enable condition- and performance-based maintenance of network components, optimizing equipment performance and hence effective utilization of assets.

Advanced Metering Infrastructure - Advanced metering infrastructure (AMI) involves the deployment of a number of technologies – in addition to advanced or smart meters12 that enable two-way flow of information, providing customers and utilities with data on electricity price and consumption, including the time and amount of electricity consumed. AMI will provide a wide range of functionalities:

- Remote consumer price signals, which can provide time-of-use pricing information.

- Ability to collect, store and report customer energy consumption data for any required time intervals or near real time.
- Improved energy diagnostics from more detailed load profiles.
- Ability to identify location and extent of outages remotely via a metering function that sends a signal when the meter goes out and when power is restored.
- Remote connection and disconnection.
- Losses and theft detection.
- Ability for a retail energy service provider to manage its revenues through more effective cash collection and debt management.

Electric Vehicle Charging Infrastructure **-** Electric vehicle charging infrastructure handles billing, scheduling and other intelligent features for smart charging (grid-to-vehicle) during low energy demand. In the long run, it is envisioned that large charging installation will provide power system ancillary services such as capacity reserve, peak load shaving and vehicle-to-grid regulation. This will include interaction with both AMI and customer-side systems.

Customer-Side Systems **-** Customer-side systems, which are used to help manage electricity consumption at the industrial, service and residential levels, include energy management systems, energy storage devices, smart appliances and distributed generation. Energy efficiency gains and peak demand reduction can be accelerated with in-home displays/energy dashboards, smart appliances and local storage. Demand response includes both manual customer response and automated, price-responsive appliances and thermostats that are connected to an energy management system or controlled with a signal from the utility or system operator.

Smart Grid Security **-** The Smart Grid makes security an imperative from the outset. A systems approach to electric power security will identify key vulnerabilities, assess the likelihood of threats and determine consequences of an attack. Resilience will be built into each element of the system and the overall system designed to deter, detect, respond and recover from man-made disruptions as well as those from natural disasters such as hurricanes and earthquakes. Planning for man-made threats will consider multiple points of potential failure. According to DOE, this approach would apply risk management methods to prioritize the allocation of resources for security. Particular goals of security programs would include:

- Identifying critical sites and systems
- Protecting selected sites using surveillance and barriers against physical attack

- Protecting systems against cyber attack using information denial (masking)
- Dispersing sites that are high-value targets
- Tolerating disruptions
- Integrating distributed energy sources and using automated distribution to speed recovery from attack

Keys to resisting attack - The Smart Grid must be designed, at the component level, to reduce the:

- Threat of attack by concealing, dispersing, eliminating or reducing single-point failures
- Vulnerability of the grid to attack by protecting key assets from physical and cyber attack
- Consequences of a successful attack by focusing resources on recover

To succeed at this task, the Smart Grid's "system requirements" rely upon greater and more sophisticated levels of automation to provide wide-area monitoring, remote system control, and predictive tools to deal with impending disruptions before they happen. In addition, the system must be capable of enabling the autonomous operation of selected grid elements and ensuring that added equipment and control systems do not create additional opportunities for attack.

B. Potential Smart Grid Benefits

Power Reliability – The smart grid provides a reliable power supply with fewer and briefer outages and higher quality power through the use of digital information, automated control, and autonomous systems. The smart grid is resilient, but when an outage does occur, it recovers faster in emergencies and limits the extent of outages. The Smart Grid will dramatically reduce the cost of power disturbances. Communications and control technologies applied to the grid will be able to isolate faults and rapidly restore service. Decision-support systems will "know" when there is the need to quickly reduce load or redirect power and respond autonomously to adverse conditions. The Smart Grid will also be able to "call for help," enlisting support from distributed energy resources to help balance system needs. Power quality events – dips in voltage lasting less than 100 milliseconds – can have the same effect on an industrial process as a more general outage that lasts minutes. A single such event can cost commercial facilities such as banks and data centers millions of dollars. Broad-based power-quality improvements will

reduce losses to American businesses across the board, from scrapped materials in industrial processes to the number of lost customers in a retail environment.

Safety and Cyber Security – The smart grid continuously monitors itself to detect unsafe or vulnerable situations that could detract from its high reliability and safe operation. Cyber security features would need to be built into all systems and operations, including physical plant monitoring, and access control for confidentiality, integrity, and privacy protection of customer data. Overlaying the entire electrical network, the Smart Grid's integrated communications infrastructure will provide detection and mitigation of both cyber and physical threats. Its ability to support a wide variety of generation options also reduces the effects of an attack at any one point on the system. Indeed, its strength is in its diversity. For example, whether natural or man-made, a diversity of distributed energy resources offers grid operators a variety of options in response to an emergency. Similarly, resource diversity within a geographic region offers additional means to restore the grid, and a diversity of fuels increases the likelihood that adequate power will be available. Also, rapid identification of problems and hazards made possible by improved monitoring and decision support systems will be able to predict equipment failure before it occurs to save lives and reduce injuries. Clearly, it is easier to service equipment routinely than during an outage event. Reducing failures also leads to reducing outages, which means traffic lights, elevators, etc., continue to function for the benefit of the public's safety.

Energy Efficiency – The smart grid is more efficient, reducing energy consumption, peak demand, and energy losses in transmission and distribution systems. Such efficiencies can help to defer the construction of new centralized generation plants to meet electricity demand. With real-time data made possible by Smart Grid technologies, utilities will be able to more effectively use assets under normal and adverse conditions. Among the benefits: A reduction in failure-related maintenance and outage costs and a longer service life among some of the assets. Overall and over time, integrated communications technologies will lessen the need for new and costly hard assets.

Integration of Renewable Energy Resources -- Smart grid enables the integration of variable renewable energy resources, such as wind, hydro, and solar energy, to supply power to the grid when the energy is available. Traditionally, the problem with some sources of renewable energy, particularly wind and solar energy, has been that they may supply power intermittently causing rapid power fluctuations on the grid. When the variable energy resource is not available, other sources must be ready to meet demand. Alternatively, to maintain system reliability, demand must be reduced to match the available supply.

Environmental and Conservation – In enabling the deployment of all forms of generation and storage, the Smart Grid will encourage greater use of distributed energy resources, including maximizing the use of existing combined heat and power (CHP) units. Residing primarily at large commercial and industrial sites, existing CHP units – the CO2 emissions profile of which are substantially lower than fossil-fueled power plants. The Smart Grid will be able to generate more energy from carbon-free sources such as centralized hydro, wind, solar and nuclear power. In addition, it will be able to better take into account the intermittency of renewables.

Financial – While smart grid developments require capital investment, programs would be designed so that benefits outweigh costs over a suitable time period. Efficiencies ushered in by the Smart Grid should mitigate some of the rising costs of electricity. Real-time price signals will allow consumers to participate based on current supply and demand pricing scenarios. Communication among these buyers and sellers should reduce grid congestion and unplanned outages, as well as determine the real price for electricity at various times throughout the day. The reach of market efficiencies is also improved.

At the local “distribution” level, for the customers of CMP and Bangor Hydro, the smart grid takes the form of new meters. Most Bangor Hydro customers already have such meters and CMP has just begun the installation of these meters (a process that may take a year and a half). These smart meters, together with radio transmitters, collectors and a central data management computer make up, for both utilities, new technology known as Advanced Metering Infrastructure or AMI. For both utilities, the Public Utilities Commission has approved the installation and use of AMI.

What makes these meters different from the old electromechanical meters is their ability to transmit data from the meter to the collectors and on to the central computer without the need for a meter reader. Data can be transmitted frequently (once every fifteen minutes), or less frequently (once per day). Each transmission lasts less than a second. Also, unlike the old meters, utilities can “ping” or test the meters from the central office to see if the customer has power. According to the utilities, this should help with power restoration efforts following storms.

If effectively implemented, customers will be able to see their usage in real time (if they are willing and able to purchase a device known as an In Home Display, currently costing about $150) or on the following day if the customer has a personal computer. In these cases, customers can begin to get a better sense of how they use power and may be able to adjust usage to save energy. “Dynamic pricing” rate plans may allow customers to save during peak usage times (hot summer days) by using less. If you are home during such

days, and have electrical appliances you can turn down or off, you may be able to save under this type of plan. In the long run, new appliances will be able to communicate with the meters in ways that could lead to more efficient power use and lower bills.

C. Electric Grid Infrastructure Projects and Proposals

Maine's electric utilities are planning to invest billions of dollars in new infrastructure.

Advanced Metering Infrastructure: Planned for enhanced customer service and access to broader demand response programs.

The AMI system includes solid-state meters, two-way communicating RF mesh network and systems to support extensive data. Operating efficiencies include automated meter reading, field service orders and more effective outage service restoration. Enhanced customer benefits would include a web portal, real-time usage/pricing information via home area networking, and systems to enable dynamic pricing. The system would support future Smart Grid initiatives including power quality monitoring and distribution automation.

Maine Power Reliability Project (MPRP): A high voltage transmission project for increasing system reliability within Maine.

Central Maine Power plans to invest $1.55 billion to modernize Maine's 40-year-old bulk power system. The proposed improvements are designed to keep the system operating reliably over the coming decades and to provide the infrastructure for the state's emerging wind, hydro, biomass, and tidal energy industries.

The Maine Power Reliability Program will add to the company's network of substations and transmission lines that stretch from the Town of Eliot on the New Hampshire border to Orrington, where it connects to transmission lines from northern and eastern Maine. The four-year construction project is expected to create an average of 2,100 jobs per year and inject more than $1 billion in spending into the region's economy.

The Maine Power Reliability Program (MPRP) is expected to provide the following benefits to CMP customers:

1. Maintain or enhance electrical reliability;
2. Maintain or enhance electrical transmission system reliability;
3. Maintain or enhance electrical power quality;
4. Ensure a safe and secure supply of power for commercial and residential service by reducing vulnerability to natural disasters;

5. Improve operating efficiency by reducing line losses through installation of modern transmission equipment or other appropriate solutions which may help keep transmission prices stable for customers;
6. Enhance the prospects for new jobs in Maine based on a more robust electrical infrastructure;
7. Create an average of 2,100 jobs with a peak of 3,327 jobs and add $289 million to the Gross Domestic Product (GDP) in Maine;
8. Support development of clean, renewable electricity resources in Maine to help reduce greenhouse gasses and dependence on high-priced oil and natural gas.

Downeast Reliability Project (DRP): A high voltage transmission line to increase reliability of electric service in Washington County that runs from Ellsworth to Harrington is almost complete.

Bangor Hydro Electric Company regularly conducts assessments of the entire electric supply system to assure that the system is reliable and capable of meeting current and future energy needs. An assessment was conducted for the Downeast service area of Maine, and it was determined that this area has several conditions that require an upgrade of the current system. Bangor Hydro's Downeast service area, which includes portions of Hancock and Washington Counties, is served by a single high voltage line. This project will provide a second, redundant line to reduce the risk of losing power to this large service area. In addition, the coastal area east of Ellsworth is in need of upgrades that will enable growth within the region and allow connection to potential renewable sources of energy. To address needed improvements, the Downeast Reliability Project was proposed. The project includes the addition of a transmission line, substation and switching station. Several alternatives were evaluated to respond to the need for reliability improvement in the Downeast area. It was determined that additional transmission capacity is necessary to boost system reliability and address other system needs.

SIDU Project: The "Synchrophasor Infrastructure and Data Utilization in the ISO New England Transmission Region" project with a budget of $18,087,427 was awarded with a Smart Grid Investment Grant of $7,993,714 from the DOE- FOA 0000058 ARRA program. It is a three-year project to deploy synchrophasor technology. The project is an essential part of ISO New England's (ISO-NE) plans for infrastructure development based on the expansion of its PMU-based disturbance detection and monitoring system to support advanced Smart Grid applications. The New England Synchrophasor Installation and Data Utilization (SIDU) system will provide the Smart Grid technology platform upon which advanced analysis and visualization tools can be deployed to enhance situational awareness. The SIDU Project will provide a Phasor Data Concentrator (PDC) capable of

handling PMUs of various designs and capabilities with support for various communication scenarios. Its architecture will enable the possibility for the New England Transmission Owners (TOs) and ISO-NE to collect and share synchrophasor and disturbance data with other regions for wide area monitoring. The SIDU Project will utilize synchrophasor data from key transmission sites within the New England Region. The installation of forty PMUs are planned, covering the power grid in the six New England states - Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont. The SIDU Project will also upgrade 5 existing PMUs in 3 different installation locations, allowing rapid deployment and demonstration of synchrophasor technologies and data collection. The SIDU system will also implement advanced applications that determine real-time stability margins and support analysis and visualization.

News About Maine and the Smart Grid

"Maine utility serves as a leader with advanced smart grid cyber security system…"

The U.S. electric grid is divided into different regions, each monitored by an Independent Service Operator (ISO). In Maine, one utility recently moved to implement enhanced smart grid cyber security measures as it looks to protect its customers from foreign hackers and other cyber criminals.

According to a report from Computer World, Portland General Electric (PGE), which operates under the jurisdiction of the New England ISO, has worked to overhaul its own cyber defense network. "Utilities have a much smaller threshold for risk than they used to," PGE cyber security director Travis Anderson affirms. "The industry is realizing, with the changes over the last decade, that they are going to be held to a higher standard for security events, or threats to the company. There are more attack vectors today, most possible inputs into critical systems." PGE has worked to exceed government guidelines, and was one of the first utilities in Maine to utilize a variety of cyber defenses like vulnerability and log management systems to protect its power supply network. What's more, the utility recently moved to install smart meters in thousands of its customers' homes, requiring additional safeguards to ensure personal data is not stolen.

"We took a hard look at our security practice and our governance around information and system protection," Anderson added. "And we developed a number of process and technology initiatives to better mature our program."

SUBNET Solutions Inc | Thursday, August 25, 2011

D. Cyber Security

Threats to cyberspace pose one of the most serious economic and national security challenges of the 21st Century for the United States. The U.S. government is seeing a rise in cyber attacks aimed at taking over control systems that operate critical infrastructure, such as industrial facilities and pipelines. The government is tracking more and more cyber attacks that have a greater level of sophistication and are tailored to target specific types of industrial infrastructure, such as power grids.

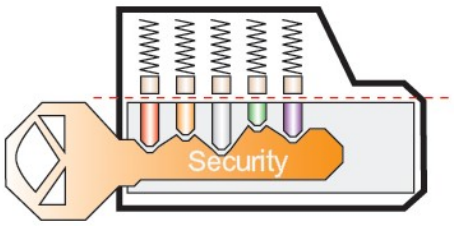
Encrypted communications and malicious software suppression are two examples of the kind of steps that utilities will take in securing their smart grid infrastructure. However, cyber security needs are actually much broader than these traditional segments, and the expanded requirements for grid security will drive extensive innovation and deployment activity within the industry.

Cyber security is not a one-time activity, like building a fence for protection. Because smart grid will be built over time, cyber security must also grow over time to address threats and vulnerabilities in the short term as well as the longer term.

Cyber security is of the utmost importance to a sustainable modern grid. The smart grid involves the automation of several manual processes and procedures. It does so, in part, by overlaying a communications infrastructure on top of the grid, allowing utilities to make better decisions about energy usage and spot potential failures more quickly.

For its part, cyber security helps to augment reliability where automated solutions and advanced processes break down. This reliability is critical to every utility and may be the most important facet of energy operations, because unreliability results in utilities' inability to provide power. Consumers may not notice the automation of the grid, but they will notice if the lights go out.

Security Standards



Currently, cyber security regulations are being applied to some elements of the transmission system but not all elements of the smart grid. Critical infrastructure protection (CIP) denotes whether or not an energy management or supply system should be bound to government oversight, and several government

agencies have begun developing CIP security standards. The Federal Energy Regulatory Commission (FERC) directed the North American Electric Reliability Corporation (NERC) to mandate standards for some of the smart grid systems, but the National Institute for Standards and Technology (NIST) is developing additional standards that will be applied to assets that make up the smart grid that currently fall under the guise of CIP.

Unfortunately, as the result of an overly narrow definition and interpretation of what is critical, much of what is normally considered a critical infrastructure system has yet to be identified and thus subjected to FERC's mandates. Although cyber security standards are important to securing the modern grid through enhancement of its reliability, they are currently only being applied in specific cases that augment reliability on the national level but not on the state or local level.

Smart grid offers a wealth of opportunities to increase energy independence, conserve resources and reduce costs. Like any innovation, new risks are bound to arise. From a cyber security perspective, giving utilities a better view of their operations and greater control over long distances means that hackers able to insert themselves into the communications channels could benefit from these improvements in automation. This is inevitable and simply means the risks shift. After all, greater awareness of the environment means fewer and shorter outages as smart grid technology is leveraged to pinpoint events and anticipated events more quickly.

Smart grid presents an opportunity to improve reliability and security rather than put the grid at greater risk, but to do so requires constant vigilance and proactive steps to address new risks.

SCADA Systems

Supervisory Control and Data Acquisition (SCADA) Systems refer to computer systems that monitor and control facility-based industrial processes, like power generation. They are centralized systems which monitor and control entire sites, or complexes of systems spread out over large areas. Unfortunately, the security of SCADA-based systems has come into question as they are

increasingly seen as extremely vulnerable to cyber warfare / cyber terrorism attacks. Ever increasing numbers of connections between SCADA systems and office networks and the Internet has made them more vulnerable to attacks.

Each electric utility serving the state of Maine has the primary responsibility for maintaining its own SCADA system.

5. Energy Infrastructure Vulnerability Assessment

Energy emergency and assurance planning requires an analysis of the vulnerability of the energy systems in the State. Specific plans to protect the critical infrastructure in Maine are kept confidential by the energy industry and the Maine Department of Defense, Veterans and Emergency Management.

Energy infrastructure is vulnerable not only to natural disasters but to deliberate assault. Increasing dependence on the Internet for energy industry communications and dispatch increases vulnerability to cyber attack. Energy infrastructure is also prone to physical attack, given numerous sources of public information on its location and importance and the accessibility of energy facilities to the public. Energy security has traditionally been the responsibility of the utilities and the energy industry, and access to information, even by energy regulators and emergency personnel, is limited.

On the one hand, individual companies are perhaps in the best position to assess their own facilities and determine how best to protect their assets. On the other hand, because individual companies may understandably wish to keep their individual plans and countermeasures confidential, there may be only limited information available to emergency response personnel.

Basic information on Maine's energy resources and Factors Contributing to their vulnerability is provided below for illustrative purposes. Maine's energy resources depend on both in-state and regional infrastructure and regional energy markets.

A. Electricity Vulnerability

The electric power system carries numerous technical constraints that limit what can be done to prevent power outages. "The system also contains many automatic control devices that respond almost instantaneously to perturbations in supply, demand and other system conditions. Hence, some measures taken to prevent outages can actually increase risk and, in some cases, create cascading effects that can collapse the entire system in a

matter of minutes. There have been enough episodes of this type of catastrophic, widespread, system failure to warrant care in the exercise of measures under emergency conditions.

Contributing Factors to Electric System Vulnerability

● ***Vital services' dependence on electricity.*** Electricity is used throughout the state for residential, commercial, and industrial purposes. Electric power keeps security and communication systems, life-support systems, and computers operating. Any interruption in electricity can have immediate impact on vital services.

● ***Infrastructure visibility.*** Electricity infrastructure is usually highly visible and thus not a hidden target.

● ***Internet insecurity.*** Utilities increasingly use the internet to monitor and control their facilities, and the internet is accessible globally and is far from secure.

● ***Reliance on competitive markets.*** Since implementation of electric industry restructuring in March 2000, prices for electric generation have been determined through competitive markets.

● ***The regional supply's dependence on natural gas.*** Regional electric generating capacity is increasingly dependent on the availability and deliverability of natural gas. Most new generating plants are gas-fired. While some of these plants are dual-fuel design, in practice they do not have the capability on site to use a second fuel (e.g. no on-site storage tanks for fuel oil). In the event of a major natural gas supply disruption, there would likely be a significant cascading effect on the price and availability of electricity.

● ***Northern Maine's dependence on New Brunswick.*** Northern Maine's electricity supply (and associated price) depends in large part on New Brunswick Power's policies and supply situation.

● ***The effect of fossil fuel prices.*** Oil and natural gas are used to generate the majority of electricity in the region, and they set the market-clearing price about two thirds of the hours. As prices for these and other petroleum products increase, electricity prices increase.

● ***Limited access to information on critical infrastructure.*** To minimize inadvertent or unnecessary release of sensitive information about critical infrastructure, federal agencies and some utilities restrict information flow to states, complicating State and local responsibility to provide initial response to an incident that challenges local infrastructure.

● ***Limited access to generation security information.*** Security plans for electric generation plants are a private-sector responsibility and are generally proprietary and confidential. They are generally not made available to emergency managers.

● ***In Maine, local supply exceeds demand.*** Maine has an electric generating capacity that is nearly twice its peak demand. While much of Maine's generating capacity serves out-of-state demand, the physical proximity of Maine consumers to excess supply increases local system reliability.

● ***Utility system security is a private sector responsibility*** pursuant to federally mandated national standards, with limited input from the PUC. Utility plans are filed with ISO-NE, NERC, FERC, NPCC, and Homeland Security but are not regulated per se.

● ***Mutual aid.*** Electric utilities have responsive mutual aid systems. When a geographic area suffers extensive damage, electric utilities in adjacent areas with available repair crews will send those crews to assist with service restoration. The Governor could facilitate the delivery of mutual aid by declaring an emergency and waiving hours of service requirements.

● ***Lack of public awareness.*** To a significant degree, electricity emergencies can be averted through sustained public education and energy conservation measures (mitigation) as witnessed in winter 2003-04 when rolling blackouts were predicted by the ISO but never occurred. Informed behavior can result in positive effects and the adage applies that "the easiest megawatt to generate is the one that isn't used."

B. Petroleum Vulnerability

At the refining level, the availability of petroleum products depends on the maintenance of an aging system of refineries. In spite of advances in refining chemistry, technology, and safety, no new refineries have been constructed in the U.S. in over 25 years. When refineries suffer outages of any kind, product supply is restricted and prices increase. The U.S. petroleum distribution and delivery system, with its network of underground pipelines, regional and local storage, and sophisticated computer controls, offers some reliability. But locally, transfers and re-supply efforts can be disrupted by severe weather and natural disasters. If problems occur in production, refining, or transport, the result is often a spot shortage with predictable price impacts.

Transportation Fuels

Maine transportation fuels arrive in Maine primarily by waterborne tanker or barge through terminals in South Portland, Searsport, and Bangor. The fuels are distributed throughout the state primarily by truck. Some portion is exported by truck to neighboring states. There is also a pipeline for gasoline running from South Portland to Bangor. The majority of transportation fuels come through South Portland.

Contributing Factors to Transportation Fuel Vulnerability

● ***Limited storage capacity.*** Limited storage capacity and the expense and regulatory hurdles associated with increased storage capacity leave Maine with limited supplies in the event of disruptions. The amount of supply in storage varies by terminal and by season. Two terminals in South Portland indicate they have nearly 30 days of gasoline supply reserves under normal demand circumstances, though supplies may be lower during the spring and fall, when the type of gasoline used in Maine changes. During changeover, there may be collectively only about a week's worth of gasoline in storage.

● ***Just-in-time inventory.*** Industry reliance on just-in-time inventory depends on a flawless delivery system.

● ***Heavy reliance on one port.*** The vast majority of transportation fuel volume comes through Portland Harbor.

● ***Price variations.*** Gasoline prices are affected by changes in crude oil prices and changes in the supply/demand balance. Typically, gasoline demand is significantly higher at its seasonal summer peak than at its low point (typically mid-January).

● ***Commercial reliance.*** Diesel fuel is used for trucking, in the construction industries for mobile equipment, and for backup electric generation.

Note: A number of factors contribute to Maine's gasoline security:

● ***Performance-based environmental regulation.*** Maine's gasoline formulation standards are performance-based. Generally speaking, much of the State uses conventional gasoline, but the regulations are flexible enough to allow reformulated gasoline (RFG) to substitute as necessary. Southern Maine relies on Mid-Atlantic regular grade fuel for summertime use, but RFG blends used in southern New England also meet Maine's fuel specifications. This is important for energy security because when supply is limited or demand is high, the market can pull in a variety of qualifying fuels to meet Maine demand. Being part of a larger market also reduces risk of price fluctuations and supply disruptions.

● ***Regional fuel specifications.*** As a matter of policy, Maine is pursuing a regional fuel specification to further improve energy security. Regional fuel specifications are important because Maine's transportation fuel market is relatively small. If Maine had a boutique fuel, it might only be supplied by a single refinery, increasing Maine's vulnerability to supply disruptions.

#2 Fuel Oil / Heating Oil

In Maine, annual consumption of #2 heating oil and kerosene is roughly 1,009 gallons per household and 427 million gallons statewide ("Maine Home Heating Report 2007"). Maine residences are overwhelmingly dependent on #2 heating oil to heat nearly 75%% their homes. While the saturation of the market place allows the prices in Maine to be slightly below the national average, the critical dependence leaves Maine vulnerable to shortages and price spikes.

Contributing Factors to #2 Fuel Oil / Heating Oil Vulnerability

● ***Limited local storage.*** Maine has very little storage capacity, no pipelines for local distribution, and little tankage. At any given time, Maine has the capability to hold and distribute about four to five days worth of heating oil.

● ***Distance to refineries.*** There are no refineries in New England, although the one in St. John, New Brunswick, is an active source for regional supplies.

● ***Just-in-time inventory management.*** Over the years, the petroleum product distribution system has changed from storage to just-in-time inventories, or fresh supply operations. This eliminates large storage tanks for environmental and economic reasons. Industry reliance on just-in-time inventories is risky, as it demands a flawless delivery system, especially given limited in-system storage. When inventories are low, relatively small changes in demand can result in significant price changes.

● ***Location at end of the supply line.*** Maine is at the end of a long supply line and is heavily dependent on ship or barge delivery of petroleum products. This dependence on marine transportation leaves Maine vulnerable to a variety of economic and weather conditions.

● ***Use of fuel oil in most Maine homes.*** Either #2 fuel oil or #6 fuel oil/kerosene is used by nearly 75 percent of Maine households for space and water heating (EIA 2003), making the state highly dependent on fuel oil supply reliability.

● ***Weather dependencies.*** Marine transportation facilities can be iced in during severe weather, and Coast Guard ice cutters increasingly have other demands on them. Truck transport can be constrained by ice and snow.

● ***Dual-fuel power plants.*** Gas-fired power plants in the region and some industrial facilities in Maine use #2 oil as a backup fuel. Thus the #2 fuel oil market can be significantly affected by supply disruptions or price shocks in natural gas markets.

● ***Pipeline vulnerability.*** Portland Pipeline damage, constraint, or curtailment could pose international vulnerabilities.

● ***Infrastructure limitations elsewhere in the region.*** The Chelsea Street Bridge Terminal in Everett, Massachusetts, has a very narrow access point that can accommodate only single-hulled tankers, which are few in number, and even single-hulled tankers pass with only inches to spare.

● ***Regional reserve limitations.*** The regional heating oil reserve can, under certain conditions, be used to relieve regional demand. But because the reserve is small (about 2 million barrels) and is stored in New Jersey, Connecticut, and Rhode Island, the oil is unlikely to be physically delivered to Maine under emergency conditions. (See Appendix G for a description of federal and regional petroleum reserves.) In addition, prompt movement of product from the regional heating oil reserve to retail dealers may be difficult due to prior commitments of available trucks and barges. At best, releases from the reserve might affect supply and price elsewhere in the region, with indirect supply and price benefits for Maine.

● ***Ten Days for foreign deliveries.*** It takes about ten days for ships to bring heating oil from the Gulf of Mexico into New York Harbor and from suppliers in Venezuela to New England.

Propane

Residential and commercial propane customers are vulnerable to any disruptions that may affect the transportation/delivery of propane by truck. Customers are also vulnerable to any disruptions in getting the propane to the terminals by rail or by pipeline or any problems in transporting by truck.

Contributing Factors to Propane Vulnerability

● ***Limited number of suppliers.*** Any disruption to a single supply source could have significant impact.

● ***Heavy reliance on limited delivery points.*** The majority of product arrives at facilities in Portland, Bangor and Auburn by rail.

● ***Petroleum market fluctuations.*** Propane prices generally correspond with crude oil and natural gas prices because it is made from crude oil and natural gas.

● ***Just-in-time delivery.*** Like other petroleum products, propane is subject to the risks associated with just-in-time delivery.

● ***Commercial and industrial use.*** About 2.4 percent of Maine's commercial energy use and about 0.6 percent of industrial energy use relies on propane (EIA 2005).

● ***Weather-related vulnerabilities.*** Regional delivery capability may be impaired if storms close roads or ice blocks terminal access.

● ***Dependence on Canadian railroad deliveries.***

● ***No legal or statutory mechanism for collecting data on propane deliveries.***

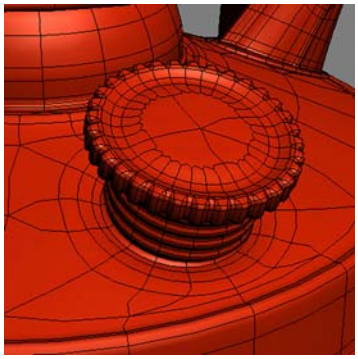
● ***No standardized communication protocol*** with Maine and regional propane terminals and dealers.

● ***Lack of information about increased demand*** for propane in the local business sector.

● ***Lack of real-time*** information to monitor freight movements in New England, Maine and Canada

Kerosene

There are two grades of kerosene: K-1 and K-2. K-2 is the most common and is used for space heating, domestic hot water and wick-fed lamps. K-1 is a very low sulfur grade that is typically used in un-vented portable space heaters. Kerosene is often the fuel of choice for mobile homes because kerosene, unlike heating oil, does not congeal when stored outdoors at temperatures below freezing. In the commercial sector, kerosene is added to diesel fuel to keep it flowing at winter temperatures.



Contributing Factors to Kerosene Vulnerability

● ***Market fluctuations and infrastructure limitations.*** As a petroleum-based product, kerosene is subject to many of the same supply, price, and distribution vulnerabilities as fuel oil and propane (see above).

● ***Percent of households served.*** About 39,600 Maine households, or only about 5 percent of the population, heats with kerosene.

● ***Domestic dependency.*** Homes heated with kerosene often have no alternative heating source.

● ***Low-income households.*** Many kerosene users are lower-income households with less capacity to withstand price shocks.

C. Natural Gas Vulnerability

Local distribution companies (LDCs) are regulated by the PUC, while the interstate pipelines are subject to federal regulation. Security is primarily a private-sector responsibility, with some input, oversight, and encouragement by regulators. LDC emergency plans are on file with the PUC. Interstate pipeline security plans are on file with the U.S. Department of Homeland Security's Transportation Security Administration (TSA).

Contributing Factors to Natural Gas Vulnerability

● ***Infrastructure visibility.*** Gas infrastructure is usually highly visible and thus not a hidden target.

● ***Internet insecurity.*** Gas utilities increasingly use modern technology, including the internet, to monitor and control their facilities; the internet is far from secure and accessible globally.

● ***Pressure loss.*** Natural gas supply is vulnerable to a loss of pressure in the transmission or distribution pipelines that supply end customers. Pressure loss may be caused by a rupture in a pipeline, or by customers withdrawing more natural gas from the distribution lines than the gas company is able to supply.

● ***Limited access to pipeline security information.*** There is limited State access to (and knowledge of) interstate pipeline vulnerabilities and security plans.

● ***Limited access to federal information.*** To minimize inadvertent or unnecessary release of sensitive information about critical infrastructure, federal agencies and some utilities restrict information flow to States, complicating the State and local responsibility to provide initial response to emergencies.

● ***Insufficient deliverability on peak winter days.*** Currently, at the regional level, there is insufficient gas deliverability available on a peak winter day for non-firm contracts.

● ***Reliance on LNG during peak times.*** LDCs are heavily dependent on LNG during times of peak demand for natural gas. Demand for LNG continues to increase, deliverability is limited, and any disruption in deliveries could have significant price impacts.

● ***Electric generation dependence on natural gas.*** Electric generation plants generally have non-firm contracts, making them particularly vulnerable to price spikes and supply shortages.

D. Renewable Energy Vulnerabilities

The energy supply in Maine relies heavily on renewable energy sources. Just as fossil fuel sources have their weaknesses, renewable energy sources have vulnerabilities as well, and that could seriously curtail energy production at various facilities.

Biomass

Biomass feedstocks come from a variety of organic matter sources. Crops grown for both agriculture and energy uses are used for biomass feedstocks, Potential opportunities exist in the forest and wood industries in Maine for increased production and use of biomass and cellulosic feedstocks. Forest residues from silviculture, or wood harvesting include limbs and tops and dead or dying trees. A collection infrastructure is in place to harvest the wood. Mill residues are available in the form of bark, chips, sander dust, edgings, sawdust, slabs and black liquor from manufacturing operations like sawmills and pulp & paper companies. Almost 98 percent of mill residues generated in the United States are currently used as fuel or to produce wood pellets, fire logs, or other wood products. Wood pellets and other compressed wood products have high energy content by weight (approximately 7,750 Btu per pound at six percent moisture content) than many other biomass feedstocks due to their high density and low-

moisture content and are relatively easy to store. Forest thinnings, including underbrush, saplings, dead or dying trees also provide a biomass resource.

Contributing Factors to Biomass Vulnerability

● ***Weather-related vulnerabilities.*** Regional delivery capability of biomass materials may be greatly impaired if storms close roads or ice blocks terminal access.

● ***Competition.*** Biomass for energy-related purposes may compete with wood uses in other applications, including pulp and paper. This competition may affect supply for heating and electricity use.

Wind / Solar / Tidal



Unlike fossil fuels, renewable energy sources in Maine are found at the point of power generation. Whereas trains, trucks and ships may provide other power plants with a steady flow of combustible materials delivering an evenly controlled and predictable "burn" to produce electric power, renewable sources (sun, wind and water) are far less predictable and can't be stockpiled for future use.

Contributing Factors to Wind / Solar / Tidal Vulnerability

● ***Weather-related vulnerabilities.*** Severe storms, excessively high winds, and icing conditions can severely impair power production.

● ***Storage capacity vulnerabilities.*** There are limitations on the amount of excess energy produced that can be stored so as to even-out distribution / transmission. Developers need to provide energy storage facilities to mitigate renewable intermittencies.

● ***Technology-related vulnerabilities.*** Electro-magnetic pulses (EMP), and to a lesser extent, solar flares, can destroy whole arrays of sensitive electronics and photovoltaic cells critical for power generation.

E. Energy Prices and Expenditures

Demand & Price Response

In Maine, there are about 500 MW of demand resources where several large industrial customers participate in the ISO's

programs. In New England, there are approximately 2,500 MW of demand resources that can reduce electricity consumption when there is a shortage of operating reserves on the electric grid or in response to high wholesale prices. Demand resources have grown substantially since the start of competitive markets and continue to grow with efforts to integrate them into the wholesale electricity markets. (See Appendix U: ISO-NE 2010 Maine Profile.)

Maine Energy Consumption, Expenditures and Prices

Total Consumption	**469 Trillion Btu's**
Consumption/Person	**356 million Btu's**
Total Expenditures	**$7.517 million statewide**
Expenditures/Person	**$5,782 per person**
Total Energy Prices	**$20.6 per million Btu's**

Sources: EIA State Level Energy Consumption, Expenditures and Prices 2007; Table 1.6
EIA State Energy Data 2008: Prices and Expenditures, Table S1a, S1b & S2b

Faced with unprecedented and historic spikes and volatility in energy costs, state policy makers, energy producers and consumers, utility executives, law makers and energy industry experts are all seeking solutions to the complex and multi-faceted challenges posed by Maine's inordinate dependence on foreign oil and other fossil fuel products. The estimated total tax revenue for the State of Maine in 2008 was $3.04 billion dollars; this is less than half of the money ($6.5 billion petro tax) Maine exports out of the state each year to pay for petroleum products. (Source: Bureau of the Budget State of Maine) As energy prices continue to rise to historic levels, with benchmark crude reaching $147/Bbl on the NYMEX in 2008, this stark energy reality has substantially increased the economic vulnerability of Maine's citizens, businesses and industries.

Maine Governor Proposes Energy Package

MAINE PUBLIC BROADCASTING NETWORK

03/09/2012 **Reported By:** Mal Leary

Gov. Paul LePage has delivered his promised energy plan for Maine, in the form of four bills he wants approved before the session ends next month. As Mal Leary reports, the governor is touting the package as a way to lower the cost of power.

Governor LePage has said repeatedly that he believes consumers in Maine, both commercial and residential users, are paying too much for their electricity. Since last fall he has been saying he would introduce a package of bills to address that issue this session. One would change the definition of a "renewable energy source" under state law.

"If you have hydroelectricity at 100 megawatts or less, it's green energy, but if you have hydro above 100 megawatts, it's no longer green," LePage says. "Hydroelectricity's probably the greenest, most renewable energy there is, but the reason they're against large hydroelectricity is because it comes cheap from Canada."

The legislation would allow power purchased from Canada to qualify under the state renewable portfolio standard that requires 35 percent of the electricity used in the state to come from renewable sources. The governor expects his proposal will face opposition from those pushing other renewable sources that he says are more expensive. "And all these fat cats, the special interests, they'll be up there testifying against it," he predicts.

Rep. Stacey Fitts is a Pittsfield Republican who co-chairs the Legislature's Energy, Utilities and Technology Committee. He says the 100-megawatt cap was put in place to protect Maine-based generators from unfair competition with Canadian hydro power from government-owned utilities.

"It's not an indictment on large hydro or anything else," Fitts says. "It's just if Maine ratepayers are going to be asked to pay a premium in any way, shape or form, it should be for Maine-based plants."

Ken Fletcher, the governor's chief energy advisor, says he cannot predict the savings that might come from changing the law, but suggests that the only way to find out is to open the possibility of negotiating lower prices with Canadian producers.

"I'm not going to promise that we're going to save $4 million, or $10 million, because it's all predicated on the fact that if that opportunity presents itself, it is positioned in a way that we can see that it is a measurable and meaningful cost reduction to Maine ratepayers," Fletcher says. "But it's like having to, versus not having the potential to."

Sen. Phil Bartlett, a Gorham democrat on the Energy Committee, says that improving efficiency and reducing the overall use of energy is the way to immediately address the high energy bills of Mainers struggling to heat their homes.

"The most important thing we can do to lower energy costs is to invest in energy efficiency, “Bartlett says. "We're never going to be--or at least not in the near term--a low-cost energy state. We don't have coal here, we don't have natural gas in the ground. So we need to figure out how to lower costs for Maine businesses today and we can do it very cheaply through energy efficiency."

Fletcher believes one of the governor's bills addresses that concern. It would expand programs offered by the Efficiency Maine Trust, including a new rebate to help consumers buy alternative energy systems to heat their homes.

"If you look at, for example, the cost of wood pellets versus the cost of heating oil, you know there’s a significant savings there, and if this causes people to say, 'You know what, I'm going to take advantage of the rebate and I'm going to go out and buy the pellet stove I've been thinking of, as one example, then that is going to save them money," Fletcher says.

The other two bills address oversight and transparency of energy policies. One would require the Public Utilities Commission and the Public Advocate to do so-called "zero-based budgeting," rather than building a budget based on the previous year's experience. Those offices would now have to justify every expenditure for the coming year. They would also be required to show all of the fees and charges on electric bills so consumers can see the detailed cost breakdown.

F. Historical Events that Caused Energy Outages in Maine

Recent energy supply disruptions, most notably the ice storm of December 2008, have highlighted the excellence, dedication and effectiveness of Maine's responders at all levels. However, there are new lessons to be learned from each event. These events also highlighted infrastructure interdependencies, the need for greater coordination among state agencies and with local governments, greater energy infrastructure resiliency, increased energy diversity and more integrated approaches to energy assurance planning. The near-paralysis of the State when the energy networks went down during the ice storm serves to remind us that there needs to be more communication, more training and a focus on preparedness for such events.

There are two (2) main causes for an energy emergency. The first is a supply problem caused by a disruption or curtailment in the energy supply chain, typically initiated by a storm, an accident or some other unforeseen event. The second is when the high cost of energy disrupts consumers' ability to purchase fuel. Due to the rapid increases in energy costs, high unemployment, and a slowly recovering economy, many Mainers are experiencing financial hardships and are no longer able to afford the high cost of heating fuels. Heating and transportation fuel costs have increased 100% in the last five years, now constituting between 10% - 20% of many Mainer's monthly incomes; this is up from 5% just a few years ago.

The impacts of rising energy prices are particularly acute in Maine where 99.9% of people are dependent on petroleum products to fuel their vehicles and nearly 75% are dependent on oil to heat their homes. In the winter, it is even more challenging to meet the public's needs.

Volatility and uncertainty in the complex international energy commodities and financial markets and dramatic increases in the price of fossil fuels are international in scope and a national approach, in partnerships with states and foreign countries, is needed to address these issues. The State's attention should focus on those areas it can reasonably identify and respond to in the short-term with the fiscal, technical and personnel resources available.

Winter 2011: On January 20, 2011, Governor Paul LePage signed an emergency proclamation to ensure heating oil deliveries are made to Maine residents. "We need to ensure that our oil delivery drivers can be on the road so that Maine homes stay warm during this difficult time," said Governor LePage. The State of Emergency proclamation enabled the granting of a waiver from the Federal Department of Transportation to allow heating oil delivery personnel to stay on the road longer to make sure homes and businesses stay warm. Demand for heating fuel deliveries was up, and the inventory of propane was down because of a disruption in supply.

The text of the proclamation follows:

> WHEREAS, the northeastern United States, including Maine, is experiencing arctic cold temperatures and dangerous wind chills;
>
> WHEREAS, this cold weather is expected to continue for approximately ten (10) days and affect the State;
>
> WHEREAS, heating fuel in Maine is in great demand because of the cold, and because supplies have lagged behind demand;
>
> WHEREAS, bulk carriers of petroleum-based heating fuels routinely diversify their loads with other petroleum fuels;
>
> WHEREAS, Federal motor carrier safety regulations determine the number of hours the drivers of heating fuel and bulk petroleum transport and delivery vehicles may operate;
>
> WHEREAS, many such drivers in the State will shortly be approaching the Federal limit on hours of operation and may have to cease delivery of heating fuel and bulk petroleum fuels;
>
> WHEREAS, these conditions threaten public health and safety and endanger public property if heating fuels cannot be transported or delivered;
>
> WHEREAS, the declaration of a State of Emergency will facilitate the granting of a waiver from the U.S. Department of Transportation – Federal Motor Carrier Safety Administration, pursuant to 49 C.F.R. part 390.23 to allow relief from 49 C.F.R. parts 390 through 399, specifically 49 C.F.R. part 395 Hours of Service of Drivers, and subject to the limitation described below, and therefore allow heating fuel and bulk petroleum transport and delivery drivers to operate additional hours; and

WHEREAS, motor carriers that have an Out-of-Service Order in effect may not take advantage of the relief from regulation that such a declaration provides under 49 C.F.R. 390.23.

NOW, THEREFORE, I, Paul R. LePage, Governor of the State of Maine, by virtue of the authority vested in me by the Constitution and laws of Maine, find that these conditions constitute a civil emergency under 37-B M.R.S.A. 742, and for the purpose pursuant to 49 C.F.R. part 390.23 of facilitating a waiver to the U.S. Department of Transportation, Federal Motor Carrier Safety Regulations, specifically 49 C.F.R. part 395 Hours of Service of Drivers, do hereby declare that a State of Emergency exists as of January 20, 2011 through January 30, 2011.

Winter 2011 (cont'd): During the week of January 17, Thibeault Energy, an 84-year old family-owned and operated full service heating fuel company in Brunswick, Maine, abruptly closed and advised its customers by recorded voice message to seek alternative oil and propane services. Many of those customers had prepaid the company for heating fuels and were unable to receive propane and heating oil deliveries from Thibeault during a very cold winter week. Other companies, including Downeast Energy, were able to pick up fuel deliveries needed in the short-term for former Thibeault customers.

Fortunately, no supply issues surfaced and residential consumers had access to heating oil and propane for their homes. However, heating fuel prices were increasing due to various global supply and demand factors and weather-related events and several of these customers had prepaid contracts with Thibeault.

In 2007, a similar event occurred whereby Maine heating oil users who prepaid for oil never received the fuel or their money back. At the request of the Governor, the Energy Office convened a meeting of state and industry officials to address the consumer, company and community energy and financial concerns. The owner was eventually found guilty of breaking Maine's unfair Trade Practices law and settled its case with consumers. Assets were also sold off to pay creditors. It is uncertain as to whether the restitution allowed those customers to fully recover their losses.

Governor LePage convened a meeting of Maine energy stakeholders including appropriate state agencies, legislators, community groups and business organizations. For example, the *Office of the Attorney General, Consumer Protection* division had jurisdiction over regulation and contracts for the sale of home heating oil and propane and was taking calls/complaints for analysis of any violations of consumer protection laws. *Midcoast Maine Community Action* provided resources and benefits for the cost of heating homes in the Topsham/Brunswick/Bath area through public and private contributions and

volunteerism and helped those who may not be eligible for limited federal, state or local fuel assistance programs. The *Maine Energy Marketers Association* includes heating oil and propane members who serve more than 415,000 Maine households and service nearly 1 million Maine people. *Maine Housing* offers a variety of energy assistance and energy conservation programs for consumers and administers (*e.g.,* Low Income Home Energy Assistance Program (LIHEAP)). Other government, private and non-profit organizations with roles and levels of expertise in energy emergencies, including providing emergency heating oil to those who qualify were also consulted.

In the short-term, the primary guidance was to give constituents guidance to contact other oil/propane dealers in the area for immediate delivery needs and contact the AG Consumer Protection division to register complaints regarding the prepaid contract and delivery issues. Maine Housing and the community action agencies were able to give advice regarding the needs of and resources available to Thibeault's low-income homeowners. The Maine Credit Union League offered no-interest loans to assist customers that needed to buy additional fuel immediately. The Governor was assured that the industry could step up and ensure that "people won't go cold" and that consumers are warm and would have necessary heating fuels, especially during the cold month of February.

Spring, 2009: A natural gas supply disruption in April of 2009 indicated Maine could be at risk of "over reliance" on Canadian energy supplies. An electrical fire and related problems shut down Exxon Mobil's natural gas compression facility at Sable Island, off the shore of Nova Scotia. The gas interruption affected Verso Paper's 175-MW cogeneration plant in Bucksport, ME and the 520-MW Maine Independence Station in Veazie, among others. The Veazie power plant can generate enough wholesale electricity to serve approximately 500,000 homes. The disruption forced the Verso mill to buy natural gas at premium prices from a different supplier so it could continue to generate electricity. Even so, the plant was only able to run at a very minimal level; they couldn't get enough natural gas to run it at full power for a week. Coincidentally there were similar supply disruptions in 2007, 2008 and 2010.

These types of supply uncertainties can have a major economic effect on Maine's electric grid and local industries and could potentially lead to some businesses closing down. These interruptions also threaten electric grid reliability. In one supply interruption in 2008, the grid serving Maine from Bangor north defaulted to rely on the New Brunswick grid. It also has an impact on Maine residents as it can lead to higher energy costs all around. When replacement gas is available on the market to make up for the gas Maine power plants have contracted for, the price is increased. Proposals to establish a Northeast

Energy Corridor with Canada are intended to transport electricity, petroleum products and natural gas with transmission lines, pipelines and related facilities from areas in the north where it can be produced, to a very hungry energy market to the south. Natural gas storage in significant volumes in Maine may help protect the state against pipeline supply uncertainties.

Winter 2007: In winter of 2007, a perfect storm of factors contributed to a propane shortage in Maine. A summary of this situation is instructive in recognizing some of Maine's vulnerabilities with respect to propane. On February 10th, over 2,800 Canadian conductors and yard workers went on strike delaying shipments of coal, grain, car parts, lumber, energy supplies and other cargo at Canada's largest port. The Governor of Maine declared a state of emergency on February 13th in order to waive the hours of service rules for transport and delivery of propane. After a significant February 14th snowstorm which dropped two feet of snow in Maine and over three to four feet in Canada, the Governor in coordination with the Maine Oil Dealers Association, issued a press release informing the public about the propane delivery problem and recommending the incorporation of conservation measures.

On February 16th, 2007, the Governor sent a letter to President Bush informing him of the situation and seeking assistance in pressuring the Canadian government to intervene in the rail strike that, along with bad weather, was crippling the ability of oil dealers to supply Maine with propane. Meanwhile, the Governor's Energy Office was getting many calls from non-heating commercial and industrial customers stating they had been cut off by their suppliers for non-essential propane deliveries. The Governor called an emergency meeting of the Energy Response Team (ERT) on February 19th and was advised by an informal Energy Task Force (ETF) composed of Energy Resource Council members, as well as many other agents of the liquid fuels industry. Surrounding New England states and New York were experiencing tight supplies but reported no allocations like Maine. Rough seas delayed the arrival of ships in Newington, NH and Providence, RI during some of the coldest weather of the winter at a time when energy demand across the region was higher than normal. Supplies of propane continued to dwindle at other New England terminals, particularly Sea-3, a port terminal in Portsmouth, NH. Sea-3 was on 50% allocation and had received product on February 15th.

Just when it appeared the situation couldn't get any worse, a pipeline rupture temporarily disrupted supplies to a terminal in Selkirk, NY that serves as an alternative source for Maine's propane needs. TEPPCO, a large propane pipeline that brings shipments from the Gulf Coast to terminals in the northeast, declared Force Majeure on propane deliveries east of Todhunter, Ohio, after detecting a leak at its Seymour, Indiana location on

February 20th. TEPPCO began repairs on its broken valve and opened up again a few days later on, February 23rd, but long lines at Selkirk were the result. Propane inventories declined in New England during the week of February 23rd by 73% as the rail strike in Canada and the outage of the TEPPCO pipeline drastically reduced propane deliveries.

According to authorities, the next Algerian waterborne shipment was not due to arrive at Sea-3 for three weeks or until March 6th. The Providence, R.I. terminal had no propane supplies and was expecting a shipment to arrive on February 24th. Portsmouth, NH Sea-3 LPG waterborne deliveries were still in a state of delay as of March 7th and then again on March 11th due to bad weather at sea. Projections were recalibrated for ship deliveries significantly impacting dealer expectations. Concerned with meeting contractual obligations, some Maine dealers were forced to drive truckloads of product from Connecticut, driving Maine propane prices up.

During this three-week re-supply gap, Maine railroad officials worked with Canadian National to retrieve propane rail cars in Montreal and put them in priority for delivery to Maine. The rail terminal in Auburn, which typically receives 40 propane cars a week during winter (each carrying 30,000 gallons), received only 15 railroad cars during the week of February 23rd. Also, Department of Homeland Security Customs and Border Protection worked with border officials to expedite deliveries into Maine by temporarily streamlining border crossing procedures. Throughout this mid-February to mid-March period, the Maine Emergency Management Agency (MEMA) coordinated all propane supply activities in the State. The governor, MEMA, Maine Department of Transportation, Governor's Energy Office and other Maine government officials were in contact with businesses, propane distributors, CEOs of propane distribution companies, the Canadian government, Northeast utilities or government organizations, federal government agencies and neighboring states. Arrangements for incremental supplies of propane to be delivered to Maine were made so that companies could meet their obligations to primary heating customers.

Maine recommended conservation measures for propane customers. Some Maine propane dealers put their non-essential commercial customers on allocation causing many of these businesses to suffer economic hardship. On February 20th, after the Canadian Industrial Relations Board refused to rule the strike illegal, a federal mediator was brought in and on February 26th a tentative agreement to end the strike against Canada's largest railroad was achieved. Striking conductors and yard-service staff went back to work and railcars finally began to move and be spotted which means the car has been hitched, processed and is moving towards its destination. There was some concern that empty cars be sent back through Sarnia to avoid the strike zone. Distributors were projecting a steady

flow of railcars with product but as of March 1st allocations from the Duke terminal in Auburn were still not consistent or adequate to meet demand. Railcars were arriving periodically but not with the necessary frequency to meet demand.

Although the strike had ended, it took weeks for supplies to arrive in Maine and the state of emergency was extended until 3/15/07 to allow the waiving of truck drivers delivery hour limits. Fast pass requirements at the border were extended to allow drivers quicker access to both sides of the border. No Mainers went without heat during the four week crisis, but Maine propane dealers had to take serious steps to control their inventories by either making partial deliveries or skipping homes whose tanks were more than half full. In some instances, dealers looked to competitors to provide enough propane to at least make partial deliveries to essential or critical need heating customers.

Due to prolonged delays in railcar deliveries, some companies were rationing supplies and sent trucks as far away as Providence to get product. All dealers had to absorb the cost of redoubling delivery to get some customers back to normal or pre-rationing levels. When it was all over, some propane distribution companies were investigating expanding their supply options while other dealers wanted to expand their storage capabilities. The propane crisis came at a time when TV ads created by the Propane Education and Research Council were promoting the use of propane as a flexible fuel for water heaters, cook-stoves, clothes-dryers and furnaces. Lessons learned from this perfect storm of events include:

- The need to have information and communication protocols.
- Good information on propane supply movements, inventory patterns, storage and consumption.
- The increased demand for propane by the industrial and commercial sectors must be better understood, tracked and documented.
- Maine needs a better understanding of its capacity to convert to dual-fuel capacity for natural gas and propane.
- The State needs to establish better personal business relationships and connections with the Northeast Propane Associations and the CEOs of propane distribution companies as these were the most helpful and valuable players in finding beneficial solutions to propane supply problems. These relationships proved to be most valuable to Maine in its time of need.

- Maine could benefit from having a real time freight monitoring system for ease in tracking the movements of fuels in and out of the State of Maine, Canada and New England.
- Maine State government needs to increase the comprehensiveness of its understanding of propane infrastructure, key players and their contact information.
- Maine State government needs to improve the communication it has with propane distributors and suppliers and institute a protocol similar to that which exists with #2 heating oil waterborne terminal operators.
- It may be necessary to enact legislation mandating bi-weekly reporting of propane inventories to the state by propane distributors as with other fuels.

6. Government Agencies & Their Roles Impacting the Energy Sector

Planning for energy emergencies is a dynamic process providing flexibility to evaluate and define a potential emergency in real time and to respond appropriately to any shortage, regardless of magnitude. Responding successfully to any type of energy emergency is based on working relationships with the energy industry and with the agencies involved in emergency response.

A. Federal Agencies & Roles

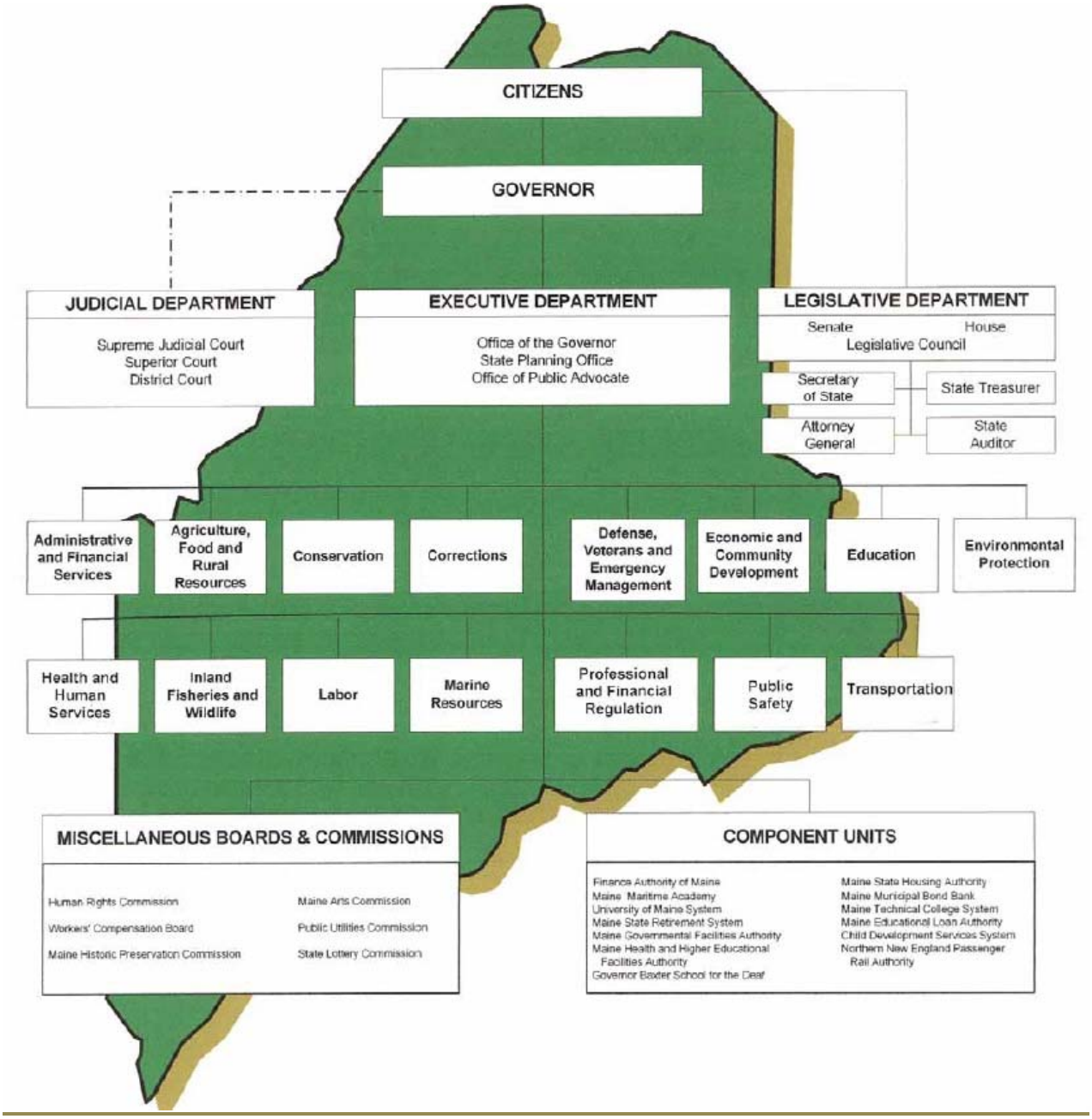
The U.S. Department of Homeland Security, as stated in the National Response Plan, has designated the U.S. Department of Energy (DOE) responsible for the Emergency Support Function (ESF) #12 – Energy at the federal level. The Office of Electricity Delivery and Energy Reliability - Infrastructure Security and Energy Restoration (ISER) Division within the DOE is the primary organization tasked to coordinate the federal response to energy emergencies and supply disruptions. In the event of an energy emergency, the ISER Division coordinates with state energy offices, national and regional power and transmission organizations, various national coordinating groups including the National Governors Association (NGA), the National Association of Regulatory Utility Commissioners (NARUC), the National Association of State Energy Officials (NASEO), the utilities, the petroleum industry, other energy industries, and various federal agencies. The ISER Division communicates with states by conference call, email, and by secure communication using the ISERnet. The ISERnet was established by DOE to share timely information among state and federal officials.

The ISER Division may also provide personnel to the Maine Emergency Operations Center to assist the state in responding in the event of a declared 'state of emergency.'

The energy emergency preparedness program of the DOE is directed toward reducing the vulnerability to energy supply disruptions and enhancing the ability to respond should a disruption occur. The federal government relies primarily on the market to resolve disruptions of crude oil supply. The market may be supplemented by measures that assist and complement it and enable it to function more effectively. One such measure is to sell crude oil from the federal Strategic Petroleum Reserve.

B. State Agencies & Roles

Organization Chart of Maine State Government



Ultimate authority in any state emergency is vested in the governor. The Maine Emergency Management Agency (MEMA) and the Governor's Energy Office are the focal points within Maine state government for energy emergency planning, preparedness, mitigation, response and recovery. MEMA has the leading role in: 1) state efforts to aid victims, 2) coordinating federal effort to aid victims, 3) building the emergency management capacity of the state government and local governments, and 4) the general enhancement of

emergency management by integration of its four functions: preparedness, mitigation, response and recovery. The roles and duties of the GOVERNOR'S ENERGY OFFICE and other agencies involved in emergency management in the state are delineated in the State of Maine Emergency Operations Plan.

State Authorities

Maine Emergency Management Agency - Statutory authority to coordinate the activities of all organizations for emergency management within the State Assistance with public information in pre-event status of energy emergencies:

- Coordination of energy emergency planning with county and local government and volunteer agencies
- Authority to call in the National Guard for assistance, information and system vulnerabilities and security risks
- Perform Simulated Table-top Energy Emergency exercise for the Energy Task Force

State and local emergency management agencies and first responders prepare for and respond to all emergencies, including those with implications for the energy infrastructure. These organizations are on the front line of emergency response at the state and local level.

Office of the Governor - Executive authority to convene an ETF, as needed:

- Authority to proclaim an energy emergency (37-B MRSA-742)

The Governor's Energy Emergency Powers include the authority to:

- Issue public warnings and announcements
- Impose restrictions on the hours during which commercial, industrial, public, and school buildings may be open
- Impose restrictions on lighting levels in commercial, industrial, public, and school buildings
- Impose restrictions on interior temperature in commercial, industrial, public, and school buildings
- Impose restrictions on the use of display and decorative lighting
- Require mandatory interruption of selected customers
- Grant waivers to utilities that have generators operating at less than their technical limits due to environmental or other restrictions
- Start up state-owned backup generators to provide additional capacity
- Direct utilities to use predetermined customer restoration priority lists to the degree the physical distribution system permits
- Request federal assistance when State resources are overwhelmed

- Take appropriate investigative and enforcement measures

• In cases of emergency, certain powers to implement or waive certain programs, standards, priorities and quotas.

Governors' offices and state legislators, represented by the National Governors Association (NGA) and the National Conference of State Legislatures (NCSL), respectively, develop policies that affect energy security and assurance and play a major role in responding to energy emergencies. These state-level decision makers coordinate with federal and industry groups on energy security and emergency issues, and possess emergency authorities, which they can exercise to mitigate the impacts of energy crises.

Governor's Energy Office – Has the authority to convene an ETF, as needed:

- Fuel supply and price monitoring
- Advising the Governor and Legislature on energy emergencies related to heating and transportation fuels and energy policy generally
- Communication and coordination point of contact with petroleum terminal operators during an energy emergency
- Receipt and management of fuel inventory data twice a month from terminal operators

State energy offices, represented by the National Association of State Energy Officials (NASEO), typically serve many energy-related functions at the state level, including coordinating responses to energy emergencies, developing state energy emergency plans, and developing practices to improve energy security and reliability at the state-level.

State Homeland Security - Directors and their offices coordinate and conduct homeland security activities at the state level, including programs involving infrastructure protection and vulnerability analysis.

Public Utilities Commission - Advises the Governor during energy emergencies regarding electricity; also waiver authority on its regulations during emergency situations:

- Authority to require updates of utility restoration plans and infrastructure information to improve utility readiness
- Monitoring of utility activities, including facility/service outages
- GIS and other data on key facilities
- Interagency notification by email of energy emergency information
- Maintenance of an energy industry emergency contact list
- Member of the Emergency Response Team

State utility commissions, represented by the National Association of Regulatory Utility Commissioners (NARUC), are government agencies engaged in the regulation of utilities (energy, water, and telecommunications) at the state-level. In this role, these organizations are involved in cost recovery issues (including energy security costs), energy supply curtailment plans, and CIP activities.

Administrative & Financial Services, Bureau of General Services – Responsible for management of the State of Maine's fuel inventory for State facilities.

Department of Conservation – Responsible for mobile generators and communications equipment for remote facilities that can be used for emergency response.

Environmental Protection – Has the authority to approve suspensions or waivers of certain requirements for limited periods of time to relieve or avoid an energy shortage.

Human Services – Can initiate emergency and other assistance programs.

Department of Transportation – Responsible for management of the State of Maine's fuel inventory for transportation. Has established protocols for reporting energy delivery issues at Port facilities and sharing Information. In charge of administration of various transportation demand management programs.

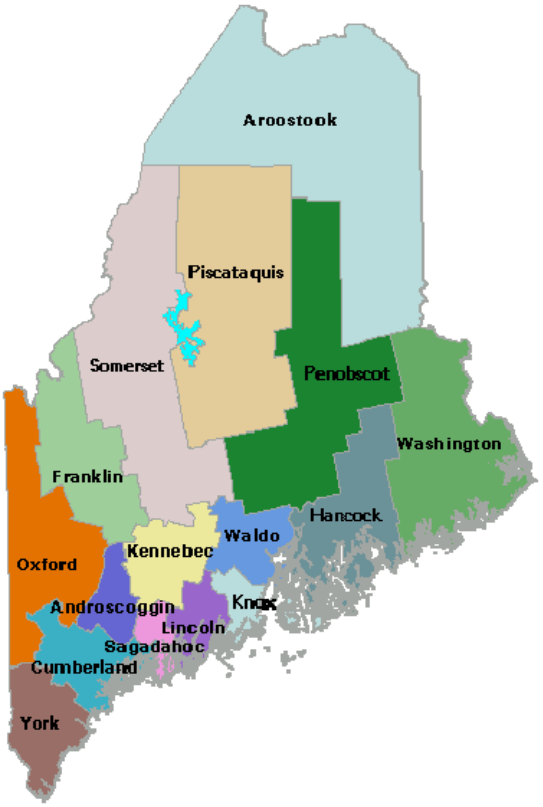
Maine Housing - Administration of LIHEAP and weatherization programs. Responsible for the Energy Crisis Intervention Program (ECIP), which provides emergency fuel deliveries and heating system repair.

Maine State Police – Has the authority to grant transportation waivers regarding border issues, weight limits, route restrictions, etc.

Attorney General - Maine's Office of Attorney General serves as an overall energy market monitor. Regardless of whether an emergency exists, the Attorney General plays a role in monitoring home heating oil and motor fuel markets under the Petroleum Market Share Act, 10 MRSA sec. 1671 et seq. This requires the Attorney General to remain in contact with market participants to ensure that he/she receives current information. As a result of this monitoring function, the Attorney General can help maintain lines of communication between the public and private sectors, while continuing to fulfill his/her constitutional role as the State's chief law enforcement officer. Also, the Attorney General's Office investigates potential violations and enforcement of Monopolies and Profiteering law 10 MRSA§§1101-1109 and the Unfair Trade Practices Act.5 MRSA§ 207 and market power monitoring under Petroleum Market Share Act. 10 MRSA §1671-1682.

Public Advocate - In-house energy industry expertise and relationships with consumer groups.

Regional Authorities



In Maine, emergency management is coordinated regionally by Emergency Management Agencies (EMAs) in each of the 16 Counties. County Directors are appointed by their respective County Commissioners, and funded in part by the County, and in part by federal funds provided through MEMA. These County EMAs provide an invaluable link between the almost 500 cities and towns in Maine and the State. They provide support and leadership in preparedness, response, recovery and mitigation to their local, business and volunteer partners. (See Appendix V.)

The mission of each County Emergency Management Agency is the coordination, preparation and carrying out of all emergency functions when a disaster extends beyond the normal mutual aid boundaries of the affected community, or several communities. The CEMA's responsibility embraces active involvement in state and federally administered programs which include:

- Civil Emergency Preparedness
- Terrorism / Weapons of Mass Destruction
- Hazardous Materials and Community Right to Know programming
- Flood preparedness and response
- Dam and reservoirs safe operation and planning program

C. Energy Emergency Organizations

Maine may coordinate its energy emergency activities with those of other Northeast states and eastern Canadian provinces. The New England ISO, the New England Governors' Conference, the National Association of State Energy Officials, the Conference of New England Governors and Eastern Canadian Premiers, the

Northeast International Committee on Energy, the New England Governor's Power Planning Committee, the Coalition of New England Governors, the New England Conference of Public Utility Commissions, and the U.S. Department of Energy are a few of the organizations available for inter-jurisdictional coordination.

D. Energy Emergency Response Mechanisms

The State of Maine may take many actions without a formal declaration of an energy emergency. If these actions and voluntary compliance of energy conservation measures do not alleviate the effects of the shortage and ensure the maintenance of essential services, and if the fuel supply crisis threatens to be both severe and prolonged, the Governor may declare an Energy Emergency (37-B MRSA 7-12) in order to assume emergency powers granted in the Civil Emergency Preparedness Act (37-B MRSA Chapter 13).

The Governor will specify in his proclamation which areas of Maine are affected by the state of emergency. Mandatory measures declared under the Governor's emergency powers will be enforced by the Department of Public Safety. Contingency measures outlined below are intended to encourage conservation and to reduce demand, prevent hoarding practices by consumers and to meet the needs of priority users during an energy crisis. Any measures implemented with regard to transportation fuel should be coordinated, to the extent possible, with all of the New England states and the Eastern Canadian provinces in order to facilitate travel within the region.

Details of potential measures to be taken with and without declaration of an energy emergency are on file with the Maine Emergency Management Agency (MEMA).

Shifting from a state of preparedness to one of response is necessarily situation-specific, and any transition must dovetail with ISO New England's Operating Procedures and federal agency procedures through the National Response Framework. Detailed descriptions of the National Response Framework Emergency Support Function 12 Energy Annex (ESF#12) and the relevant ISO-NE Operating Procedures are in Appendix A and J respectively.

The manner in which any state agency works with a Regional Transmission Organization (RTO)/Independent System Operator (ISO) in the implementation of some or all of these

measures depend upon the legal authorities in place. In most instances, a cooperative working relationship exists, as no state has legal authority over an RTO/ISO. The usual arrangement is for the RTO/ISO to develop collaborative working protocols that keep states informed under any system-wide emergency condition identified by the regional power entity.

ISO New England, the RTO for Maine, has a detailed set of operating procedures that it follows in the event of a short-term capacity deficiency (OP-4), a long term energy emergency (OP-21), or acute emergency (OP-7). Communication with state agencies, including the PUC, MEMA, and the Governor's Energy Office, is a component of ISO New England's procedures. ISO New England's OP-10 establishes communications protocols within the context of specific emergency incidents and disturbances. In addition, all relevant state agencies keep copies of all RTO/ISO website addresses and ensure that the RTO/ISO state agency representatives exchange and maintain current and 24-hour contact names, data, and essential communications devices.

The ISO-NE has a formal, detailed plan to address electricity emergencies. This plan is referred to as Operating Procedure No. 4 (OP-4) or "Action during a Capacity Deficiency". These actions are implemented when operating reserves fall below required levels to give grid operators time to respond to a variety of circumstances and conditions. The OP-4 is a series of 10 independent actions to increase supply or decrease demand to address a capacity deficiency. These actions can be applied to the system as a whole, throughout New England, or on a sub-regional scale to address region-specific shortfalls.

The relevant ISO-NE operating procedures are attached as an appendix to this report (see Appendix J). In the event of an electricity emergency, ISO-NE informs the appropriate state agencies and executes the following response procedures:

- Monitor Conditions
- Issue public warnings and announcements
- Assist in the Arrangement of special electricity purchase contracts
- Issue public request for load reduction
- Implement load reduction measures at State facilities
- Governor declares a state of emergency

The following are generic response measures that may be taken by the RTO/ISOs in the event of an electricity emergency:

- Curtailing outside sales of power or increasing power imports
- Modifying the operation of generating units for emergency relief
- Requesting selected customers to reduce their load, either voluntarily or with controlled active load management
- Asking all customers to voluntarily implement active load reductions
- Reducing voltage
- Implementing controlled rotating interruptions

Electricity restructuring in Maine and in other regions of the U.S. has changed the way electricity is produced and sold. In many states, including Maine, utility-owned generating and transmission assets have been unbundled, creating separate generating and transmission/distribution entities. Generation is now owned by private entities and operates in a competitive market. Regulated transmission and distribution (T&D) utilities and State regulators have less impact on the electric utility since restructuring. Independent system operators (ISO) or regional transmission organization (RTO) structures operate regional electricity grids. Many of the rules are administered by the Federal Energy Regulatory Commission (FERC).

RTO/ISOs also operate market systems that solicit and price transactions for various services. As RTOs, they have real-time knowledge of the status of the electric system within their own and adjacent operating areas, including fuel type and supplies, power plant operational status, and predictive models that describe the reliability of forecasted and current operations. They also have established emergency plans for dealing with conditions when the power system is stressed. RTO/ISOs function as independent electric transmission operators, balancing authorities and reliability coordinators for a single state or multi-state region.

In the Northeast there are two RTOs: the New England ISO and the New York ISO. Both continually monitor our regional system needs and resources. In the event of an identified situation that prevents the system from operating reliably, it will declare a system emergency. When time permits, announcement of a system emergency is typically preceded by a system alert and a system warning.

The Maine Public Utilities Commission (PUC) continues to exercise regulatory authority over the state's electric and natural gas utilities. No provision in the energy emergency program should be construed to constrain the PUC in the performance of its duties and responsibilities as mandated by law. Each electric and natural gas utility has emergency

curtailment plans on file with the PUC. The MEMA and Governor's Energy Office coordinate with the PUC in all energy emergencies and supply disruptions related to utilities regulated by the PUC and energy emergencies related to pipeline safety. The energy emergency contacts and the website for the PUC are listed in the State Government section of Appendix B.

7. State Plan for Enhancing Resiliency and Protecting Critical Energy Infrastructure

A. Critical Energy Infrastructure

In Maine the Adjutant General oversees development of a State Homeland Security Strategic Plan. Maine Public Utilities Commission (PUC) staff serve on or participate with stakeholder teams identified to develop key plan objectives in support of homeland security efforts. PUC staff has been added to the Maine Emergency Response Team to advise the Governor and Maine Emergency Management Agency on utility-related issues. The PUC assists the Adjutant General, State Police, National Guard, and emergency managers in contacting utilities whose infrastructure may be threatened.

B. Plan for Critical Infrastructure Protection

The security of electric generation in Maine and much of the regional electric generation on which Maine depends are an industry responsibility pursuant to federal standards and are not regulated by State government. Security of interstate facilities, such as gas pipelines, is also an industry responsibility, with some federal oversight. Security plans are filed with the U.S. Department of Homeland Security. State utility regulators have an opportunity to review these plans when they are prepared, but copies of the plans are not kept at the State level. Security of other private-sector facilities, such as petroleum storage facilities, is generally handled by individual companies, in some cases working cooperatively with local officials. Access to information by State officials is subject to industry discretion.

Maine law provides that “every public utility shall furnish safe, reasonable and adequate facilities and service” (35-A MRSA §301(1).) The PUC provides oversight and encouragement, but security itself is primarily the responsibility of the utilities, which are required by FERC to meet certain security standards. Meanwhile, the security of electric generation in Maine and much of the regional electric generation on which Maine depends is an industry responsibility pursuant to federal standards, and is not regulated by State government.

A significant objective of Maine's Homeland Security strategy is to improve the protection of critical infrastructure and key resources across the State. The MIAC supports this initiative through the Critical Infrastructure Protection Program (CIPP), which aims to

improve the flow of information and intelligence to and from various public and private entities. CIPP is broken into seventeen sectors of key resources:

- Agriculture and Food
- Defense Industrial Base
- Energy
- Public Health and Healthcare
- National Monuments and Icons
- Banking and Finance
- Drinking Water and Treatment Systems
- Chemical Facilities
- Commercial Facilities
- Dams
- Emergency Services
- Commercial Nuclear Reactors, Materials, and Waste
- Information Technology
- Telecommunications
- Postal and Shipping
- Transportation Systems
- Government Facilities

Maine has both public and private assets that fall into each of the CIPP sectors. Under *Homeland Security Presidential Directive #7 (HSPD-7)* and the *Department of Homeland Security's National Infrastructure Protection Plan (NIPP)*, Maine Emergency Management Agency and the MIAC are working to build partnerships across the various sectors that include State, County, and Local officials, as well as private sector representatives from each of the seventeen sectors.

CIPP efforts extend beyond vulnerability assessments and improved physical security at key facilities in Maine. Through partnerships and information exchange, we hope to provide homeland security alerts and warnings, security assessments and advisories, and other critical information to sector leadership. The results of CIPP will be a better informed and better prepared public and private sector, leading to increased protection of Maine's critical assets.

8. Energy Stakeholders

Electric energy in Maine is comprised of two components: delivery and supply. Delivery includes transmission, distribution and customer-related functions such as metering and billing; and supply includes the production and provision of electric energy and capacity. Delivery is fully regulated; markets provide supply. Maine electricity consumers receive delivery service from a transmission and distribution (T&D) utility and supply service from a Maine-licensed competitive electricity provider (CEP). The PUC fully regulates the operations and rates of the T&D utilities, except for transmission rates, which are regulated by the Federal Energy Regulatory Commission (FERC).

With respect to supply, the PUC licenses CEPs, oversees the retail market, and administers the competitive procurement processes for standard offer service. Standard offer service provides electricity supply for customers who do not participate in the retail market. The PUC is required to ensure that standard offer service is available to all customers who do not have another retail supplier. The PUC procures standard offer service through periodic competitive bid processes. The PUC also monitors the regional wholesale markets and related activities of the New England Independent System Operator (ISO-NE), and advocates for Maine consumers in regional forums and before the FERC.

There are thirteen T&D utilities in Maine: three investor-owned utilities (IOUs) and ten consumer-owned utilities (COUs). The IOUs, Central Maine Power Company (CMP), Bangor Hydro-Electric Company (BHE) and Maine Public Service Company (MPS), serve about 95% of the total State load. There are currently 121 Maine-licensed CEPs, and during 2009, seven different CEPs provided standard offer service. More detail about the T&Ds and CEPs is provided below. In addition to the T&D utilities and CEPs that provide service directly to retail consumers, there are also several electricity generation facilities located in Maine. Summary information about these facilities is provided in Appendix C.

Electricity use by Maine consumers is currently about 12 million megawatt hours (MWh) per year, with a peak demand of about 2,200 MW. Maine is currently a net electricity exporter, with total generation capacity from in-state plants in the range of 3,500 MW.

A diverse group of stakeholders have vested interests in Maine's energy use and its impact on the environment. Key stakeholders actively involved include national and state governments, committees, and NGOs as well as energy distributors, suppliers, and Maine consumers. (See Appendix B: Energy Stakeholders.)

A. Government Stakeholders

Federal

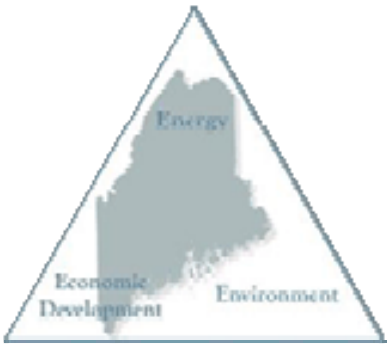
Within the U.S. Congress, there are various committees with jurisdiction over energy issues:

- The House Committee on Energy and Commerce and the Senate Committee on Energy and Natural Resources jurisdiction ranges from the generation, regulation, and production of all energy resources to the general management of the Department of Energy (DOE) and FERC.
- The House Committee on Natural Resources deals with mining interests and petroleum conservation on private lands.
- The House Committee on Science, Space, and Technology controls all energy research, development and demonstration and the commercial application of energy technology.
- The Senate Committee on Environment and Public Works has jurisdiction over climate change, air, water and waste regulation and transportation infrastructure.

Executive agencies of the US government are responsible for enforcing the federal laws discussed in the laws section. The three vital agencies concerned with energy are the DOE, Environmental Protection Agency (EPA), and FERC.

- DOE's mission is to advance the national, economic, and energy security of the US through its promotion of science and technology.
- EPA implements Congress's environmental laws through regulations and national standards that states self-regulate. EPA also awards grants for environmental studies, educates the public on environmental issues, and publishes reports.
- FERC regulates the interstate transmission of natural gas, oil, hydropower, and electricity. FERC also reviews proposals for interstate natural gas pipelines, licenses hydropower projects, and builds liquefied natural gas terminals. FERC promotes the development of a strong energy infrastructure, supports competitive markets, and prevents market manipulation.

State



- The Governor's Energy Office works with international, federal, state and regional government officials, the Legislature, and private and nonprofit sectors, to create effective public and private partnerships that advance the achievement of energy security, economic development, and environmental health. Its mission includes strategies to strengthen energy efficiency, conservation and weatherization; foster renewable energy; improve transportation and fuel efficiencies; upgrade electricity and natural gas services, transmission systems and infrastructures; State of Maine Leading by Example; and energy emergency preparedness and response. The Governor's Energy Office provides fuel supply and monitoring functions; advises the Governor and Legislature on energy emergencies and energy policy; communicates with petroleum terminal operators during an emergency; develops and revises the State of Maine Comprehensive Energy Action Plan and Energy Emergency Management Plan.
- The Maine Office of the Attorney General issued the Consumer Home Heating Rights, which regulates the sale of home heating oil during the winter months in Maine.
- The Public Advocate represents Maine consumers in matters regulated by PUC to make sure that they are receiving the best services possible.
- Maine Department of Environmental Protection (MDEP) is directed by legislative mandate to "prevent, abate, and control the pollution of the air, water, and land." The Board of Environmental Protection consists of a ten member citizen board appointed by the Governor and is responsible for providing a public forum for department decisions.
- The Maine State Housing Authority (MSHA) goal is to help Mainers acquire and "maintain decent, safe, affordable housing and services suitable to their unique housing needs. In carrying out this mission, Maine Housing will provide leadership, maximize resources, and promote partnerships to develop and implement sound housing policy."
- The Maine Public Utilities Commission (PUC) regulates the electric, gas, water, telecommunications, and ferries for the state of Maine.

The PUC is continually working to improve communications with all utility sectors. The PUC is active on the MEMA Emergency Response Team (ERT) and has developed internal emergency response plans that will allow quicker response to any events that may occur and is participating in routine and major exercises of the State's emergency response capabilities. The PUC continues to expand its Geographical Information Systems (GIS) capabilities. This technology is growing in importance as federal, state, and local governments move to improve their ability to respond to catastrophic events either manmade or naturally caused.

- The Efficiency Maine Trust develops and implements energy efficiency and renewable energy programs for businesses and residents. A wide range of programs provide incentives, training and technical assistance to residents, businesses, contractors, schoolchildren and others.

B. Non-Governmental Organizations (NGOs)

Non-governmental organizations (NGOs) often provide information of use in energy policy and strategy. On the federal level, these include the National Resources Defense Council (NDRC), the American Council on Renewable Energy (ACORE), the Environmental Studies Institute (EESI), the Alliance to Save Energy (ASE) and the various renewable and traditional energy associations (representing petroleum, natural gas, solar, wind, etc.).

Maine-based NGOs are energy information providers for state government officials. The Natural Resources Council of Maine (NRCM) advocates for policies to improve the air quality in Maine and to reduce global warming pollution through its "Clean Air, Clean Energy" project. The Maine Renewable Energy Association (MREA) is a not-for-profit association of renewable power producers, suppliers of goods and services to those producers, and supporters of the renewable power industry in Maine. MREA members generate electricity in a sustainable manner from wind power, hydro, biomass, tidal, and waste to energy. The Industrial Energy Consumers Group represents Maine industrial energy consumers before regulatory, legislative and congressional bodies on energy-related issues. The group is a collective voice that actively works to affect low cost electrical rates and to promote well-designed and monitored competitive energy markets the benefit both the end user and the environment. The IECG has actively supported construction of natural gas pipelines to and in Maine for economic and environmental reasons.

C. Generation, Transmission and Distribution

Distributors and suppliers provide energy to consumers and are an important link in the stakeholder chain. Maine is served by three investor-owned utilities: Central Maine Power (CMP is subsidiary of Iberdrola USA), Bangor Hydro Electric Company (subsidiary of Emera), and Maine Public Service, in addition to a handful of consumer-owned utilities (cooperatives).

- CMP's service area includes the southwestern part of the state. CMP serves about 600,000 customer accounts in an 11,000 square mile area in central and southern Maine, and distributes over three billion kWh of residential electricity annually.

- Bangor Hydro Electric Company, from the parent company of Emera, serves the eastern part of Maine. Bangor Hydro has around 86,000 residential customers and distributes almost 484 million kWh of electricity annually to households.

- MPS supplies power to the northern part of Maine. MPS has about 26,000 residential customers and distributes almost 164 million kWh of residential electricity annually. There are 10 other electric utility companies in Maine that have smaller distribution areas.

All three utilities provide service to Maine's industrial and commercial customers as well as residential consumers.

Maine's current Renewable Portfolio Standard (RPS) is set at 30%, and currently, it is estimated that Maine meets or exceeds that goal. It is expected that Maine's RPS will grow to 40% in 2017. This will create a RPS standards that is one of the highest in the nation (the 2nd highest is California, with an expected RPS of 33% by 2030).

Maine generates a larger share of its electricity from non-hydroelectric renewable resources more than any other State. Included in its alternative energy resources is three active wind facilities with 28 turbines (42 megawatts) in Mars Hill, Stetson Mountain has 38 turbines (57 megawatts) with 17 more planned, and the third is located on Kibby Mountain with 44 turbines (132 megawatts) that is currently under construction, with almost half operational.

Major Non-Nuclear Electricity Generating Plants:

- **William F. Wyman (FPL Energy Wyman LLC)**
- **Gorham Energy Project (Gorham Energy LP)**
- **Westbrook Energy Center (Calpine Operating Services Company Inc)**
- **Maine Independence Station (Casco Bay Energy Co LLC)**
- **Verso Paper (Verso Bucksport LLC)**

D. Consumers

Due to its energy-intensive forest products industry, Maine is the only New England State in which industry is the leading energy-consuming sector. Maine has the highest wood and wood waste power generation capacity in the United States.

Residential consumers, as the second highest energy users in Maine, play an important role in the energy economy. About three-quarters of Maine's households – the highest share in the Nation – use fuel oil for home heating.

E. ISO-NE

Regional Transmission Organizations are responsible for moving electricity across state lines. ISO-NE is the RTO which serves the New England states by ensuring daily operation of the bulk power generation and transmission system. They accomplish this by overseeing and ensuring administration of the region's wholesale electricity markets and managing comprehensive, regional planning processes.

The ISO New England (ISO-NE) is registered as the balancing authority, planning authority, reliability coordinator, transmission operator, and transmission planner for the area in which Central Maine Power (CMP) is located. ISO-NE works with transmission owners to assess system performance through the regional system planning process. The Regional System Plan and NEPOOL planning process applies predominantly to transmission facilities at 115 kV and higher voltages.

CMP is registered as a transmission planner and has also assumed the role of a local control center (MLCC) within the ISO-NE footprint for the Maine area. Central Maine Power Company's planning process is comprised of three basic components:

1. A periodic review of 14 areas (the CMP service territory divided into 14 geographic load-serving areas) a load flow analysis is typically performed;
2. Applications for service made either directly to CMP or to ISO-NE for load or generation additions, which require a system impact study; and
3. Coordinated or joint studies with ISO-NE and/or neighboring utilities.

CMP applies its own "Transmission Planning Criteria" for its 34.5 kV network and parts of its 115 kV system that are not part of the bulk power system. CMP coordinates its planning process with ISO-NE and neighboring utilities.

A New England Comprehensive Area Review is performed at least every four years to evaluate the projected reliability of the ISO-NE power system, including reactive requirements in New England for five years in the future. In the intervening years, annual or interim reviews assess year-ahead system conditions.

F. Interaction with Federal, Regional and Local Authorities

CMP and Bangor Hydro are signatories to a transmission operating agreement between the ISO New England and participating New England-area transmission owners. The agreement authorizes ISO-NE to serve as the reliability coordinator on behalf of CMP and BHE and further defines the roles and responsibilities of the signatories.

The CMP transmission system operators have the written authority letter to implement the necessary steps to protect the reliability of the system, up to and including the shedding of firm load. This letter is signed by the vice president, technical services and is posted in the primary control room and at the backup control center. The operator's authority to reliably operate the system is also stated in the operator's job description.

9. Energy Supply Disruption Process

Operations of the Emergency Task Force operations include gathering data, assessing risks and impacts, developing a situation-specific action plan before taking action, reassessing risks and impacts, revising the situation-specific action plan and updating, integrating, and reviewing relevant data.

A. Monitoring Energy Supplies

Energy supply monitoring takes place on a regular basis. State energy offices (SEOs) and public utility commissions keep track of energy developments pertaining to the state, its region, and the nation through industry contacts, trade publications, and statistical reports. The EIA website and the Monthly Energy Review provide an abundance of reports and statistics on all types of energy, arranged in a variety of ways to make the data easy to find.

Independent Statistics & Analysis
U.S. Energy Information Administration

http://www.eia.doe.gov/

http://www.eia.doe.gov/emeu/mer/contents.html

Energy Supply Disruption Tracking

Maine's *Energy Supply Disruption Tracking Process* (found in Appendix S) is based on the Virtual USA concept that integrates existing resources to provide real-time situational awareness with data from multiple sources and jurisdictions. This concept is also known as a Common Operating Picture (COP). The data (e.g., weather, electric utility outage data, and road closure) is integrated and can be analyzed, mapped and shared for interagency planning, supply disruption response and recovery.

MEMA/MEGIS has the task of formally developing the *Energy Supply Disruption Tracking Process*. This Task will be the centerpiece of Maine's Energy Assurance plan. Maine's critical energy infrastructure spans a large geographic area that is sparsely populated. This network of energy and communications utilities is the lifeline of the state's communities. Maintaining these networks and recovering quickly from disruptions is of the utmost importance to Maine's state agencies ability to ensure the public safety is being provided for.

This effort is conducted in a partnership with the MPUC, MEMA, MEGIS and one of Maine's large electric utilities. The project integrates existing utility outage information into an internet-based, geo-referenced user display that can be access by all emergency management and energy officials with a need to know. This work will greatly enhance the situational awareness for emergency managers and first responders and will fill a need recently recognized by the Maine Homeland Security Strategy working group.

a. While there are many applications that use geo-referenced data and commercial and propriety GIS products, the data needed to populate these applications has been developed and an architecture that protects the sensitive data is required. This system not only identifies available sources of real time data, it also involves educating stakeholders about the value of such data and devising ways that protect the data sources while mitigating the effort and cost needed to collect and share it.

b. The verification method for this Task will be the energy supply disruption tracking application that is available for all Maine agencies (subject to their need to know). There will be oversight of the program by the MPUC and the Governor's Energy Office.

c. Virtual Maine phase I was completed in the winter of 2011. In Phase II, additional data is being loaded and additional functionality will be enabled allowing greater use of Virtual Maine, and the ability to monitor situations in neighboring US States and Canadian Provinces.

d. Phase 2 is developing and implementing the additional functional requirements that have been documented in the process of implementing Phase 1 of Virtual Maine. Phase 2 will implement data sharing requirements with the local, state, and federal government agencies and Canada. Utility outage data agreements will be implemented for the remaining electric utilities aside from Bangor Hydroelectric. Virtual Maine will also be integrated into the FEMA IPAWS system. A training class will be developed to instruct users in how to utilize the Virtual Maine system. The Basemap will be improved through the addition of new imagery and dynamic representation of situational awareness data provided by emergency personnel via the WebEOC software.

Because Maine is a sparsely populated state with a relatively small state government, response to emergencies, including disruptions of energy supply, is a joint responsibility shared by many agencies and coordinated by the Governor's office (usually through MEMA in partnership with the multi-agency Emergency Response Team (ERT)). For

example, Maine's electric utilities are required to report outage information to the PUC (a member of the ERT). Today, this data is provided in a variety of formats, including email text and Excel spreadsheets and shared with ERT members via email. In addition, pursuant to state statute, owners of petroleum storage facilities are required to submit a report to the Governor's Energy Office on the first and third Monday of each month with total inventories of petroleum product stored and imported in Maine. This data also arrives in a variety of inconsistent formats such as word documents and email and is not currently shared with other agencies regularly.

Today, MEMA uses a Statewide Incident Management System (SWIMs) GIS application to view some data (for example, stream gauges), but the platform is old and limited and requires custom programming to add additional data. MEMA also uses WebEOC to share information with its partners. This is largely in the form of text in incident logs and most of the data must be input manually.

While Maine has struggled to better anticipate and respond to energy supply disruptions, it has also recognized a need to better prepare for all hazards and emergencies. Among the Recommendations included in the April 2010 After Action Report from the October 29-30, 2009 Maine State Functional Exercise, conducted as a joint effort by MEMA, Federal Emergency Management Agency (FEMA), and the Department of Homeland Security (DHS) is the Recommendation related to Observation 5.4 that "MEMA should develop a comprehensive common operating picture system that incorporates improved utility status information flow and builds on and improves the utility outage information available through the PUC." This echoed a need, recently recognized by the Maine Homeland Security Strategy working group, for a "Common Operating Picture" to better respond to emergencies.

Security

One reason the GEE was selected as the platform is that it comes with a well developed, robust, and easy to implement security system. This enables the primary administrator of the COP (MEMA) to manage access to each data set, including editing and downloading "rights". This is accomplished through implementing user groups and user roles. MEMA will have responsibility for determining the groups and roles for all of the users accessing the COP. The security for these groups and roles, however, cannot override the security implemented by the individual data owners, such as the PUC.

10. Energy Emergency Procedures by Phased Response

The Plan defines seven status phases for responding to energy shortages / emergencies. The point of transition from one phase to the next phase is not absolute and to a large degree is subjective. The implementation of each phase is a Governor's Energy Office policy decision, recognizing the importance of how the public perceives the seriousness of the energy emergency and how the public would respond. The various conditions are as follows:

STATUS CALM: Routine supply and price monitoring reveals no alarming trends.

- Governor's Energy Office continues to monitor the supply and price of energy resources.
- Governor's Energy Office routinely disseminates information to the public, the Governor, Legislature, and members of the ETF, as appropriate.
- Administration of existing mitigation programs (conservation, public education, etc.) continues.

STATUS WATCHFUL: Monitoring indicates a trend to high prices and/or shortages in Maine or shortages in neighboring interrelated markets that could affect Maine.

- The Governor's Office calls for follow-up meetings of the ETF. Assignments are given for active information sharing, research, and coordination activities.
- ETF designees assess availability of interagency resources, set priorities, and assess the need for shifting personnel resources among state agencies to perform event specific duties.
- ETF designees step up public information programs as appropriate to include specialized press releases, public service announcements, newspaper inserts, etc.
- ETF designees assess the need for voluntary energy-saving activities such as expanded ride-sharing programs, voluntary conservation, etc.

STATUS ALERT: An actual critical shortage is occurring, a sudden event makes a shortage imminent, or long-term high prices have exhausted financial resources.

Note: *The alert level either (1) initiates the activities listed below, or (2) describes, for organizational purposes, the state of affairs as symbolized by the activities below.*

ALERT LEVEL 1 –

- Local and state emergency response agencies respond to the emergency.

ALERT LEVEL 2 –

- The State EOC is activated with partial staff to track and coordinate response activities.
- Members of the ETF act as technical advisors to the EOC.
- The ETF considers steps the Governor can take short of a declaration of emergency, such as load reduction through conservation, checking on neighbors, and, finally, evacuation or relocation of those most affected.
- The need for a Governor's Declaration of Energy Emergency is assessed (see Appendix A).
- Consideration begins, if appropriate, of a request for release from the Northeast Heating Oil Reserve.

ALERT LEVEL 3 – Full activation. All activities and communications should adhere to the protocols of the National Incident Management system.

- All Alert Level 2 activities, plus activation of the State's full Emergency Response Team.

ALERT LEVEL 4 – Catastrophic event.

- All Level 3 activities, plus implementation of the Federal Response Framework (FRF).
- The ERT works with the federal government and the private sector through the Energy Annex (Emergency Support Function #12) of the National Response Framework.

11. Energy Emergency Response Strategies for Maine

In the event of an energy supply shortage or disruption, the response strategies are the key components of the Maine Energy Assurance and Emergency Management Plan. The initial response strategies are public appeals for voluntary energy efficiency. The additional response strategies, in the event the shortage worsens, are a series of measures to increase energy supply and reduce energy consumption.

Public appeals for voluntary energy efficiency measures will be issued by the governor's office in coordination with MEMA. Any mandatory energy-efficiency measures will be issued by the governor's office.

A. Public Information Measures

One of the most effective actions that can be taken during an energy emergency is to provide a strong, integrated public information program. Timely, accurate information on the nature, severity, and possible duration of the energy emergency will help prevent confusion and uncertainty and will help enlist the support and cooperation of citizens. It is also vital that the public clearly understands the cause of the energy emergency and the steps that need to be taken to lessen its impact. A lack of adequate information on the emergency situation, and the actions that are being taken to cope with it, can lead to undesirable reactions or panic that will only worsen with time.

The purpose of Public Information Measures is to promote compliance with each of the measures discussed in the Plan, and to inform the public about conservation actions that would enable them to cope with a fuel supply shortage. The Governor's Office, the Governor's Energy Office, the Maine Emergency Management Agency, the Efficiency Maine Trust and the Maine Public Utilities Commission (PUC) would disseminate information on voluntary energy-efficiency measures, information on any mandatory measures required, and information on the status of the shortage. This information would be disseminated through radio and television stations, the Internet, direct telephone contact, and newspapers.

B. Public Information and Dissemination Guidelines

General guidelines for dealing with the public affairs aspects of an energy emergency are listed as follows:

1. Be prepared. Before an emergency occurs, plan for gathering and relaying information to the news media and key decision-makers. Maintain an up-to-date email, telephone and address directory of key individuals to be contacted from the news media, state agencies, local governments, the federal government, and the energy industry. A secondary point of contact should be maintained for each key position.

2. Verify information before release. Be cooperative with news people, but avoid giving out incomplete or unverified information.

3. Prepare information packages for media release. Press packages at press conferences and prepared statements for news media will contribute to accurate, thorough reporting.

4. Utilize the news media to assist in informing the public on the implementation of voluntary and mandatory demand reduction measures.

5. Assure that information provided is factual. Use the national level information available from DOE to describe what external forces, such as international markets, shipping, transportation, accidents, or weather are affecting the state's energy situation.

6. Ensure that local and state elected officials are receiving as much information as the news media.

7. Utilize trained communications staff educated on energy emergency response. The effort should be staffed by personnel skilled in dealing with the news media, with knowledge of the key energy issues, and with an understanding of the various aspects of the emergency.

8. Provide concise, practical information. Energy emergencies are often caused by complex factors. Public response can be easily swayed by fragmented and inconcise information.

Communication with the Media

In an emergency, it is important to keep the media informed but calm about the situation as it develops; partial information is almost always better than an official information vacuum. If possible, use only one spokesperson for consistency in dealing with the news media and only one centralized point for issuance.

Care should be taken not to sensationalize events to the press. Media releases should not be overly conservative or rash. Keeping the public calm will help prevent panic-buying. To the extent possible, members of the ETF should share timely information on the scope, nature, severity, and possible duration of the emergency and share all information communicated with the media with each other to encourage consistency and clarity in communications.

Coordination

MEMA will establish a clearinghouse for information from both the public and private sectors to aid the state government in tailoring responses to the specific characteristics of the emergency. Modifications or the redesign of state actions may be needed in response to feedback on changing market conditions or unanticipated energy problems confronting the public and the private sector.

Operational Considerations

- ***Data and Information Acquisition and Dissemination*** - State government must be prepared to gather information and data on the impacts of the emergency, along with suggestions for responding to the emergency from the federal government and state agencies. The dissemination of emergency information must be timely and carefully controlled.
- ***Equipment Requirements*** – The Emergency Operations Center (EOC) has been tasked with securing all computer equipment and communications interfaces necessary to execute emergency response activities.

Ongoing Public Information Resources

The State provides a number of widely available public information resources to help Mainers better understand energy, emergency and safety issues.

- ***Maine Energy Information Website.*** The web site, located on the Internet at www.maine.gov/oeis.com contains indexed topical energy information, conservation tips and links to other energy-related information. The site is maintained by the Governor's Energy Office.
- ***MEMA Press Release Library***. MEMA maintains a library of press releases on safety issues relating to all hazards. Included are such energy-related subjects as winter weather safety, generator safety, etc. This information is available online at www.maineprepares.com and can also be customized to current need and disseminated quickly to media outlets as needed.
- ***2-1-1 Maine***. 2-1-1 Maine is a comprehensive statewide directory of over 8,000 health and human services available in Maine. The toll free 2-1-1 hotline connects callers to trained call specialists who can help 24 hours a day, 7 days a week.

The Governor's Energy Office has created a one-stop informational Website at www.maine.gov/oeis/energyemergency with an easy reference to public and private energy assurance and emergency management resources as a component of the State of Maine Energy Assurance and Emergency Management Plan. The site and accompanying directory will be frequently revised as additional resources are added, current contacts change and the overall Plan is updated and amended. The Web site and directory provide guidance only and will not provide legal or policy advice. Please contact individual organizations for most current and accurate information.

Event - or Time Period - Specific Resources

- ***Special Public Service Announcements***. PSAs featuring the Governor with a conservation message for radio and television were developed in 2000, 2004 and 2005 and can be updated as needed or serve as a template for future PSAs.
- ***Special Newspaper Inserts***. In 2000, a special newspaper insert was produced in concert with several state agencies and private industry and inserted in daily newspapers statewide. The insert included articles on conservation, weatherization and safety. This publication serves as a template for future such efforts.

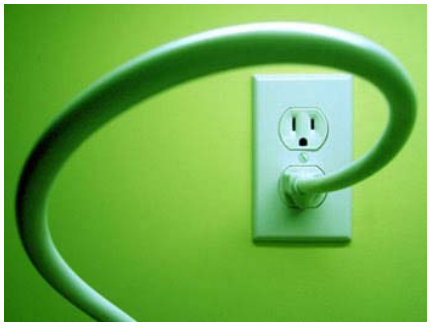
C. Waiver of Load Restriction Measures and Driver Hours

Requests by the State of Maine to temporarily remove restrictions on truck driver hours and truck weight limits have proven to be effective in reducing the impact of energy emergencies in Maine. Requests for such waivers would be made through the Maine Department of Transportation (DOT). Temporarily waiving these restrictions are especially beneficial for improving local supplies of propane, petroleum, and kerosene by allowing quicker replenishment into and within the State. The Governor's Office coordinates with the appropriate entities when requesting the temporary removal of the restrictions on truck driver hours and truck weight limits.

D. Demand Reduction Strategies

The following energy demand reduction strategies are intended to help mitigate the effects of a temporary energy shortage. These demand reduction strategies would be implemented to minimize the adverse impacts on public health, safety, and the state's economy. The demand reduction strategies, both voluntary and mandatory, are recommended depending on the severity of the shortage.

Electric Demand Reduction Strategies



The Governor of Maine may initiate a ***State Government Emergency Energy Efficiency Program*** by Executive Order. The program would reduce the usage of electricity or natural gas by state agencies. The program would require state agencies to institute energy-efficiency measures including temperature adjustment in state facilities, modified work schedules, and reduced usage of lighting, equipment and appliances.

Restriction of temperatures in commercial nonresidential buildings in Maine could be mandated by Executive Order of the Governor under his/her broad emergency powers once a 'state of emergency' is proclaimed. The purpose of this measure is to reduce consumption of energy by placing restrictions on space heating and cooling thermostat settings and hot water thermostat settings in all public and private non-residential buildings. This measure places thermostat setting restrictions as follows:

- *65º F during the heating season*
- *105º F hot water for domestic hot water used for cleaning and restrooms*

Exemptions or alternatives will be provided to persons, buildings or activities that cannot feasibly comply with simple restrictions on temperature thermostat setting. Four classes of buildings will be excluded from the temperature restrictions:

1. Residential buildings
2. Hotel and motel lodging facilities
3. Hospital and health-care facilities
4. Elementary schools, nursery schools, and day care centers

This measure is similar to the Federal Emergency Building Temperature Restrictions Program implemented in the early 1980s. This mandatory temperature restriction at schools and offices will also lead to energy conservation in residential areas on a voluntary basis. To have effective implementation of this measure, an extensive public information program will be required to inform building owners and operators on the economics of energy-efficient operation of heating, air-conditioning, and ventilation systems

Natural Gas Demand Reduction Strategies

The Governor's Energy Office will work with the PUC, the natural gas industry and other appropriate agencies to promote and disseminate energy efficiency information to help reduce the demand of natural gas. Where co-generation is feasible, power plants dependant on natural gas will be encouraged to switch over to compatible alternate fuel sources.

Petroleum Demand Reduction Strategies

Given the complexity of the international and national petroleum markets, there are steps a state, such as Maine, can take in response to a petroleum product shortage and / or disruption situation:

- Issue public warnings and announcements.
- Monitor conditions.
- Require county and municipal petroleum product emergency plans.
- Issue public requests for voluntary demand reductions.
- Enhance supply and re-supply.

- Develop strong public/private relationships with all relevant international, national, regional, state and local oil producers, refiners, retailers, and distributors.
- Grant waivers to delivery trucks to extend hours of service.
- Take investigative and enforcement measures.
- Impose purchase restrictions on liquid fuels and petroleum products, including minimum purchase requirements, odd/even license plate purchase authorizations, or staggered days of operation.
- Request federal assistance using the protocols set up by the National Response Framework Energy Annex.

Phases of Petroleum Demand Reduction

Petroleum demand reduction measures may be divided into three phases of shortage in order to guide effective response measures. These phases address mild, moderate and severe petroleum shortages. These response measures are designed in accord with the severity of a shortage in order to reduce travel and fuel purchases gradually as severity increases.

PHASE I - MILD SHORTAGE (5%-10% Shortfall)

Characterized by: Relatively small lines (one to five automobiles) at some fuel pumps.

At this stage, MEMA will encourage citizens not to become alarmed, but to reduce their vehicular usage.

Measures Utilized:

1. Petroleum Demand Reduction Information and Dissemination
    - Alternatives to Single Occupant Automobile Travel *(Bus, rail, taxi, and ridesharing - carpool/vanpool)*
    - Increasing the Fuel Efficiency of Automobiles *(Proper vehicle maintenance, Improving driving practices, Appropriate vehicle selection, etc.)*
    - Reducing Automobile-Based Travel *(Call for voluntary fuel conservation, Combine trips and limit discretionary travel, Reduce recreational travel and promoting closer-to-home vacations)*
    - Encouraging Speed Limit Compliance *(Emphasize state and local speeding laws and penalties)*

Promote walking and bike riding *(Emphasize reduced traffic congestion and reduced parking problems, Emphasize the positive benefits of walking and biking)*

2. Speed Limit Enforcement
    - Achieve maximum energy savings through strict enforcement of all existing speed limits *(Benefits - reduced accident incidence and better gasoline mileage)*

PHASE II - MODERATE SHORTAGE (10%-20% Shortfall)

Characterized by: Many lines at the fuel pumps, 5-10 automobiles long

Measures Utilized: (the measures in Phase I plus demand restraint measures directed at businesses, government facilities, and educational institutions)

1. Employer / School Plan that would apply to all public and private employers operating one or more work sites with 50 or more persons employed
    - Encourage fuel reduction by requesting employers to develop work-related travel reduction programs [e.g. telecommuting, 4-day work weeks, etc.].
    - Educational institutions would also be requested to reduce the volume of vehicles and vehicle trips.
    - A percent reduction in fuel consumption [such as 25%] would be established by the state.
2. Drive-Up Windows Prohibition
    - Businesses with drive-up windows will be asked to refrain from operating window service until the fuel emergency is over. *(Banks, pharmacies, fast food, and other establishments)*
3. Request Waiver of Federal Reid Vapor Pressure Fuel Requirements
4. Request Waiver for Sale of Off-road Diesel for On-road Use

PHASE III - SEVERE SHORTAGE (20% and Greater Shortfall)

Characterized by: Lines are common, ten plus automobiles in line at fuel stations, many stations out of fuel, federal government may implement an emergency plan to regulate fuel distribution)

Measures Utilized: (the measures in Phase I and II)

1. Minimum Fuel Purchase
    - Initiate gas station line management program to deter drivers from “topping-off” their gas tanks before they need to.
    - An 8-gallon minimum purchase would be imposed for all vehicles [except public transportation vehicles, postal vehicles, emergency vehicles, emergency repair and service vehicles, motorcycles], the 8-gallon limit may be adjusted according to the degree of shortage).
    - Odd-Even day fuel sales system
2. Driverless Days
    - Conserve energy by requiring all private owners of gasoline and diesel-powered motor vehicles to forego use of their vehicles one, two, or three days per week, depending on the severity of the shortage.
    - Vehicle owners would be required to affix to their vehicles windshield stickers indicating the day / days on which driving is prohibited.
3. Lowering the Speed Limit
    - Current speed limits would be lowered by Executive Order under the emergency powers of the Governor of Maine once a ‘state of emergency’ is proclaimed.
    - State and local laws permit, penalties for violating speed limits will be increased during severe petroleum shortages to provide a significant disincentive to speeding and provide additional funds for increased law enforcement.

4. Close Non-Essential State Buildings
    - Institute compressed work week for state employees
    - Adjust thermostats to conserve heating oil
5. Institute Allocation of Heating Fuels
    - Heating oil, kerosene, propane and natural gas emergency allocation system

Additional Measures

In the event of a severe shortage, the MEMA may recommend additional measures. Examples of measures that would be considered include:

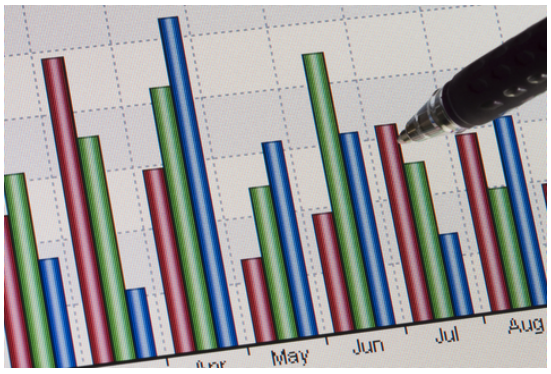
- Establishing priority service for vanpools at service station pumps
- Requesting high occupancy vehicle lanes on urban freeways

12. State Plan for Enhancing Resiliency and Protecting Critical Energy Infrastructure

The prioritization of the recovery of social and economic infrastructure quickly becomes one of the most highly charged issues in energy assurance and emergency response and restoration planning. Resources are limited and everyone perceives their needs to be paramount. The unsystematic answer to these questions often leaves some stakeholders being disappointed or litigious. The systematic answer will be based on restoration priority policies and a set of metrics to guide system operations, budgets, investments and to assess organizational performance.

The sections below describe how various government groups and policy experts have approached the setting of priorities and metrics for restoration operations. The *Maine Energy Assurance and Emergency Management Plan* recognizes that some policy guidelines are needed but that the setting of priorities will be a process that varies with situation and evolves with experience and feedback over time.

A. Metrics and Decision Support



Whereas operational metrics provide an indication of the present state of a Company's environmental performance, management metrics furnish information on steps being taken to influence operations. Management metrics describe such things as the allocation of funds and labor, implementation of environmental programs and new environmental policies, environment-related legal expenses, environmental remediation activities and the status of environmental information systems. Metrics like these are designed to inform management and support decision making on the expenditure of time, money, and labor required to maintain or improve a company's environmental performance. Information on how and where corporate resources are allocated can help to

identify problem areas and opportunities for improvement. Management indicators, particularly those related to budgeting (i.e., for capital, operations, and maintenance), may also help companies assess the worth of previous environmental investments. Projects and programs that show a positive return on investment provide incentive for continued efforts to improve environmental performance**.** (Source: National Academy of Engineering – "Industrial Environmental Performance Metrics)

The concept of developing metrics can be readily extended to apply to disaster recovery, with appropriate objective functions and priorities. Metrics and priorities are two different concepts. Priorities are the goals of, in this case, restoration operations while the metrics are measures of the effectiveness of the organization in meeting its goals.

An established method of instilling a process of continual improvement in disaster recovery is by using after action lessons learned. For Hurricane Katrina, an after action report was developed for the National Academy of Engineering. The studies' main conclusions were:

- *A proactive approach to disaster preparation is crucial to disaster recovery*
- The greatest cost savings resulted from the effective use of outside resources and the effective use of time. The establishment and operation of staging areas and the procurement of food, shelter, fuel, and security are critical to the efficient use of resources
- Close coordination with, and support from, government agencies and officials was also crucial.

B. Energy Restoration Priorities

It is important to establish energy infrastructure priorities (for electric and natural gas), independent of, but in concert with local utilities. Identify all essential customer services and ensure that these customers are considered priority customers by the utility. If the jurisdiction and utilities do not discuss priority customers (like the emergency operations center) then

when a brown-out occurs for example, they may not direct power to the facilities that are deemed as important and essential.

T&D is usually repaired first by utilities, along with high-tension transmission lines. Local distribution lines are usually repaired next. Local governments are important but only one of a long list of priorities.

- Hospitals;
- Public service entities including, emergency operations centers, critical government facilities, and Red Cross facilities;
- Communications with emergency responders including police and fire, telecommunications and the media;
- Water and sewage facilities;
- Transportation infrastructure;
- Gas supply utilities;
- Electric company facilities;
- Other essential entities such as schools, nursing homes, and critical care facilities; and
- Others as designated in coordination with government and the emergency operation centers.

(*Based on U.S. Department of Energy, Office of Electricity Delivery and Energy Reliability, NASEO, June 2005*)

In planning for critical infrastructure assurance at the municipal level, it is suggested that the following list of typical critical facilities and criteria for determining their criticality should be taken into account:

Typical Critical Facilities and Criteria

Type of Critical Facility	Example	Typical Criticality Criteria
Emergency Services	Police stations, Fire stations, Paramedic stations, Emergency communications transmitters	All facilities considered critical
Water System	Water supply pumping stations, Wastewater pumping stations and treatment plants	Facilities needed to provide sufficient pumping capacity to maintain minimum flow rates and minimum pressure
Transportation	Traffic intersections, Airport terminals and air traffic control, Railroad crossings, Electric rail systems	Major traffic intersections, Aviation facilities, Protected rail crossings, Electric rail systems
Medical	Hospitals, Nursing homes, Mental health treatment facilities, Specialized treatment centers (out-patient surgery, dialysis, cancer therapy), Rehabilitation and Blood donation centers	All facilities that require a state license to operate, Facilities with any patients on electrically powered life support equipment
Schools	Nursery schools, Kindergartens, Elementary schools, High schools, Colleges, Business and trade schools	All schools when in session
Day Care	Child day care facilities, Sitter services, After-school centers	Facilities that require a state license to operate
Senior Care	Senior citizen centers, Retirement communities	Facilities that require a state license to operate
Social Services	Homeless/transient shelters, Missions and Soup kitchens, Youth-Family-Battered Person shelters, Heating and cooling shelters	Facilities that require municipal fire safety inspections
Prisons / Jails	Jails, Prisons, Youth detention centers	All facilities
Community Centers	Libraries, Civic Centers, Recreational facilities	Facilities that require municipal fire safety inspections
Public Assembly	Sports stadiums, Concert auditoriums, Theaters, Cinemas, Shopping malls, Religious facilities, Conference centers, art centers and museums	Facilities that require municipal fire safety inspections
Hotels	Hotels, Motels, Boarding houses	Facilities required to register under tax laws
High-Rise Buildings	Apartments, Condos, Office buildings	Buildings seven (7) stories or higher
Food Services	Restaurants, Supermarkets, Grocery stores, Food processing facilities	Facilities required to register under tax laws, Facilities with significant quantities of food stored on the premises
Industry	Hazardous material handling	All Facilities

While these selections are reasonable, in the face of conflicting priorities even these need to be further prioritized. The DHS Sept. 2008 "Guide to Critical Infrastructure and Key Resources at the State, Regional, Local, Tribal and Territorial Level" notes (Sect.4.5 pp36-37) that priorities are needed but delicately steps away from any recommendation except that all the stakeholders be involved.

The seriousness of the problem of dealing with recovery is recognized on a national scale. The President has convened a National Disaster Recovery working group, co-chaired by the DHS and HUD departments and they have produced a **"**National Disaster Recovery Framework (NDRF). The latest version of that Framework was published Feb. 2010.

C. NDRF Priorities

The *National Disaster Recovery Framework (NDRF)* draft outlines how community recovery is supported on a national level. The framework builds on scalable, flexible, and adaptable coordinating structures to align key roles and responsibilities, linking local, state, tribal and federal governments, the private sector, and voluntary, and faith-based and community organizations that play vital roles in recovery. It captures resources, capabilities, and best practices for recovering from disaster, recognizing that significant challenges can confront all recovery efforts, from a relatively localized event to a large-scale disaster that demands substantial resources. Once finalized, this Draft NDRF is intended to be the companion document to the National Response Framework (NRF) issued in January 2008. (See Appendix M for the “State Governments Disaster Checklist”)

> *"States manage and drive the overall recovery process and play a key role in coordinating recovery activities within the state and with other levels of government. As the basis for all legal authority within a state, state governments wield influence over many tools to enable disaster recovery through legislation, regulation, and management of state and some federal resources.*
>
> *States act as a conduit for some key federal recovery assistance programs to the local governments. In addition to managing federal resources, state governments may develop programs or raise money (i.e. issue bonds) to finance recovery projects. Where there are additional needs to be met, they can reassign existing internal resources to streamline and expedite recovery, such as forming a new or ad hoc state recovery agency."*

The NDRF denotes roles in recovery for all the stakeholders, public, and private, including localities, non-profits and even down to the level of individuals. It stresses the importance of preparation in successful disaster recovery. Indeed, a theme that flows through all disaster recovery literature is that successful disaster recovery operations occur before the event and not during and after the event.

Thus while vital functions need to be maintained, there needs to be developed and communicated a procedure for allocation of scarce resources. Those organizations and citizens that might have to wait for the restoration of critical energy supplies need to be assured that the system not only has a metric based methodology for allocation of resources, but also has a competently designed methodology for assuring high availability of energy resources. Some of that is addressed in other sections, but a general bottom up strategy to assure not just energy but information resources are available needs to be developed.

One approach to this is outlined in work of Klaus Schmidt "High Availability and Disaster Recovery" (Springer Verlag, 2006). In this work, systematic principles of the design of disaster recovery layered solutions and the types of redundancy and other measures of assuring minimum loss based on real world experience are explored. While real-world issues involved coordination of heterogeneous resources, the concepts discussed provide a framework for policy makers to construct solutions to the complex disaster recovery system for the State.

The conclusion is that Maine needs to comply with the emerging federal mandates for energy emergency response, energy assurance and disaster recovery, but the responsible officials in State Government need to craft and develop policies that are optimal for the unique mix of energy sources, resources and geography in Maine.

13. Emergency Communications Procedures

A. Energy Emergency and Assurance Coordinator Program

Communication and information sharing are essential elements to ensuring that all states develop harmonized, efficient and effective approaches to critical infrastructure protection and emergency response. The Energy Emergency and Assurance Coordinator(s) (EEAC) program was established through a joint effort of:

- U.S. Department of Energy (DOE),
- National Association of Regulatory Utility Commissioners (NARUC), and
- National Association of State Energy Officials (NASEO).

The emergency communication landscape is rapidly changing. Present standards of radio communication are being inventoried and moved to narrowband channels. The communication system will need to incorporate and interoperate with a disparate range of devices ranging from smart phones to sophisticated satellite tracking systems and networks. The public and private emergency communications systems need to share information while maintaining security. The energy supply disruption tracking system will serve as a key component of a statewide emergency communication network. Indeed, the entire system will begin resembling a military command and communication system with many of the same architectural constraints. These systems are not inexpensive and careful staging of the implementation is needed to stay within budgetary limitations. Below we summarize some of the major programs, organizations and standards presently operative.

This energy emergency and assurance communications protocol is geared specifically at communications and information sharing within the energy sector. NARUC and NASEO enlisted the support of their membership in order to identify one or more individuals to serve as points of contact for the EEAC communication system. These persons serve as the states' key representatives for communicating information during an energy event.

Providers of essential energy services can be vulnerable to systems failures, natural disasters, and terrorist attacks. Vulnerabilities and threats, along with interdependencies among all of the critical utility infrastructures, point to the vital importance of effective

methods for exchanging information, as well as opportunities for continuous attention and improvement. The August 2003 Northeast power blackout, for example, illustrated how communication deficiencies can compound a challenging situation (a 3,500 MW power surge affected the transmission grid; more than 508 generating units at 265 power plants shut down during the outage).

In the context of an emergency, more immediate and more detailed situational information will make decision-making more timely, effective, and responsive. This need extends beyond state boundaries; a coordinated regional effort will produce even greater benefits.

An effective intergovernmental communication strategy addresses the sustained flow of information from top to bottom and bottom to top. Information that can and should be shared among federal, regional, state, and local representatives include specifics related to the nature of the emergency or condition and its impact.

ISAC's

In practice, a number of communications systems are in place to facilitate information sharing in the energy sector. The federal and state pipeline safety programs, in which many of the state commissions participate, are an example of long-standing experience in this area (Office of Pipeline Safety, U.S. Department of Transportation). Across the sectors, the Department of Homeland Security has established Information Sharing and Analysis Centers or ISACs to allow critical sectors to share information and coordinate activities. ISACs have been created for more than a dozen sectors, including the ISACs in the energy, water, and telecommunications sectors. ISAC's are established to facilitate information sharing in emergencies. In addition, the DHS established a broad network to facilitate real-time information sharing and analysis. Maine is a member of the Multi-State Information Sharing and Analysis Center (MS-ISAC) and the New England State Police Information Network (NESPIN).

However, as important as systems are, how to implement and manage these systemic resources is key. One dimension of this problem is the cyber security information protection issue. That has and is receiving due attention and is described elsewhere in this Plan. The other is managing heterogeneous data sources, simulations, and decision support systems. This will require significant effort to establish metadata standards for interoperability of sensors and situational awareness systems and should be addressed as part of the effort to establish the Maine Energy Assurance Communication Standards.

EEAC Operations

The purpose of the EEAC system is to promote effective intergovernmental communication (federal-regional-state-local), foster a cooperative environment during an energy emergency or energy supply disruption, and coordinate protection of critical energy infrastructures.

The system is triggered when an elected or appointed official declares an energy emergency or other significant energy supply disruption that requires monitoring. EEAC officials may contact or be contacted by DOE or representatives in neighboring states as events warrant.

The EEAC contact list includes qualified and authorized personnel and alternates within the state and territorial governments, as well as key contact information for federal agencies identified by DOE. The contacts have access to current information on their state's profile, including information on supplies, infrastructure, demand, and pricing. Contacts can provide credible and reliable information to the Governor's office, other appropriate state officials, and DOE. Depending on each state's institutional design, one or more individuals may be designated to address the different sectors—petroleum (gasoline, diesel fuel, heating oil, propane, etc.), natural gas, and electricity.

The EEAC communication system provides a means of addressing information-sharing needs primarily through email distribution lists. Only non-proprietary information is shared via the e-mail list or conference calls.

It is vital for government agencies to recognize and endorse the legitimacy and essential role of the EEAC system. Chief officials, Homeland Security designees, and emergency management officials across the nation will rely on state coordinators to present timely and objective analysis and recommendations that will help mitigate adverse impacts of energy emergencies and disruptions.

The EEAC system is a working model for intergovernmental communications for the energy sector in the context of growing concerns about security, reliability, and interdependency of networked utility services. The benefits of improved communication during an energy emergency extend to other vital areas that affect peoples' lives and livelihood, including water and sanitation, communications, transportation, and other energy-dependent activities and services.

A comprehensive system for coordinated information sharing helps address interdependencies, as well as vulnerabilities and maintaining safety and reliability. Over time, the system of communication and information sharing encompassing all of our interdependent utility sectors is refined.

The protocols outlined below have been developed to improve communication and information sharing through the EEAC system.

Events that warrant communication with the EEAC:

- Obvious large–scale event (attack on the power grid, international oil disruption, major ice storm, hurricane, etc.).
- Emergent problems (spring gasoline change over causing a noticeable effect on supply, severe cold weather, pipeline disruptions, requests for driver hour waivers, price spikes, and other indictors of stress on supplies (sub-state, statewide, and regional)).
- Routine summer and winter energy assessments.

Types of information that should be shared (nonproprietary):

- Information that quantifies the size, scope, and potential duration of the problem.
- Geographic area affected.
- Upstream and downstream effects in the energy supply, transmission, and distribution systems.
- Public statements made by state officials.
- Specific actions by state or local governments to mitigate impacts.
- Requests from industry for assistance and response
- In-state media reports that reasonably describe the problem.

How the EEAC list should be used:

- DOE may request information from a state that reports energy problems.
- States may request information from DOE regarding events, particularly international events that may be affecting energy supply and price.
- States should use the list to communicate regionally. Often problems are not limited to a single state.
- Too much information is often better than little or no information, but not always.

- If in doubt use the contact system; a brief message can go a long way.
- Everyone is busy in a shortage, but communication is key.

When information should be sent out to the EEAC:

- When market indicators suggest the potential for supply problems and when monitoring will be stepped up.
- When an event occurs that effects energy supply/demand or price. (Such as the run on Midwest gasoline supplies on 9/11)
- When an energy emergency or state of disaster is declared which affects energy supply.
- An international event occurs that affects energy supply. (DOE should communicate its analysis to the states.)

EEAC's responsibilities:

- Be a credible and timely source of information.
- If you don't have the answers, you need to be able to get the answers quickly from preexisting contacts in state government.
- Know and meet with others in your states who are on the EEAC list.
- Check the various websites regularly for the relevant posting of additional information as warranted.
- Exercise the list periodically by sending status information to regional states (get in the habit).
- Periodically check your contact information on the list, and update it regularly to keep it current.
- Know the EEAC's in your region. Have their names and number on your emergency contact list. Don't rely solely on the web site. (Have a paper copy.)

What to do if you get a message from another EEAC:

- If you have any information to lend further insights to the problem, respond to all that received the message.
- If the message was sent to the full list you should exercise judgment as to whether or not to respond to all.

- Indicate whether you are or are not seeing similar problems in your state. It is useful to know when others are seeing a problem and your state is not.
- Verify the information – do not rely solely on your own personal knowledge. Maybe the matter has not yet come to your attention.

The EEAC can be accessed at: http://www.naseo.org/energyassurance/coordinators.htm.

National Emergency Communications Plan

Guidelines for Emergency Communication were established in 2008 when DHS issued the National Emergency Communications Plan. This plan describes recommended procedures, and communications priorities. In addition DHS established an Office of Cyber security and Communications, with three sub offices:

1. National Communications System
2. National Cyber Security Division
3. Office of Emergency Communications

Each of these sub offices provides assistance and support to state efforts and compliance with DHS standards will make it easier to receive support and assistance in this and other areas.

In addition to the DHS, the FBI has a program; Infraguard (http://www.infragard.net/) aimed at facilitating information sharing between the private sector and the Government. Since the private sector has regulatory, law enforcement, privacy and security concerns about sharing information with the government, membership and participation in Infraguard will make policy makers and energy assurance staff aware of the issues, better able to respond to concerns of the private sector and, through such concern and adoption of best practices, likely to improve information sharing in disruptions.

Emergency Task Force Communications

Emergency Task Force (ETF) operations include vital communication links within Maine government and the various utility entities. In addition to any communication processes established by and for Maine's ETF, the following communication routes are available:

- Federal email notification system for major energy disruptions. The USDOE Office of Electricity Delivery and Energy Reliability (OE) maintains a restricted-access

communications network for key State-level personnel to exchange information and coordinate with each other and the Department of Energy during energy emergencies. This system, Energy Emergency Assurance Coordinators (EEAC), includes representatives from The Governor's Energy Office and the PUC.

- Regional energy monitoring group. The New England Governors' Conference (NEGC) conducts weekly conference calls among energy coordinators in each of the New England states and New York, including appropriate federal agency and energy industry representatives, to share information on regional energy supply, demand, and price issues.

B. Concept of Operations Plan

Two-way radio voice communications are critical to the effective management of first responders and the coordination of their duties as well as their safety during emergency operations. Radio communication enables the immediate and critical command and control function in all public safety operations, but especially during emergency and disaster operations which require multi-agency (police, fire and EMS) within a community, mutual aid response and outside agency support from local, county, state and federal agencies. Communications planning is an important part of incident response planning. In order for effective communications to exist, interoperability between agencies must exist. Simply, agencies must be able to communicate by radio and with one another in and effective and efficient manner.

According to Public Safety Wireless Network (PSWN), a jointly sponsored initiative by the Department of Justice and Treasury and now part of SAFECOM, the purpose of interoperability is so that *"no man, woman or child ever loses his or her life because public safety officials cannot talk to one another*". PSWN states that *"interoperability is the ability for on demand and real time radio communications between public safety personnel and personnel from other agencies".* Simply, interoperability is the ability of public safety officials to communicate with each other across different radio systems when the need arises.

Public safety agencies in Maine must establish interoperability capabilities and protocols that will allow them to meet the increased demands for interoperability within local

jurisdictions, with mutual aid partners, state, federal and non-traditional responders when the need arises.

Good interoperability will enhance public safety operations day-to-day as well as during mutual aid, major events, emergencies and disasters. Partnering with all of our communities in this effort will lead to a more coordinated and effective capability to meet the public safety needs throughout the State of Maine.

C. Assumptions

The State of Maine's Office of Information Technology, in coordination with the Maine Department of Public Safety and the Maine Emergency Management Agency, has arranged for the use of six (6) statewide talk-around channels for on-scene interoperability between mobile and portable radio users. All public safety agencies in the state will agree to support this Concept of Operation (CONOPS).

1. All Police, Fire, EMS and nontraditional public safety agencies VHF portable and mobile radios may be programmed with the common interoperability channels identified in this CONOPS, thereby establishing a standard throughout the state.

2. Federal, State and local non-traditional public safety agencies will be provided with the channel/frequency assignments (ICS Form 205 or equivalent) for use when responding to events and incidents within the state.

3. Incident Commanders will familiarize themselves with this Communications Operations Plan and ensure that proper use of these channels is accomplished to ensure that interoperability exists. The 6 CONOPS Channels are licensed by the State of Maine or statewide agencies (Me Fire Chief's Assoc, Maine EMS, etc.) for mobile and portable radio use statewide. They will be utilized for on-scene interoperable communications at the direction of the Incident Commander when a CONOPS operation has been authorized.

4. The Incident Commander or designated representative, which may be the Communications Unit Leader (CommL), or a dispatcher, will assign talk-around channels as needed based upon the nature of the event or incident.

5. All public safety agencies should establish Memorandums of Understanding (MOUs) with their neighboring communities for the purpose of confirming the implementation of this CONOPS.

6. Interoperability with agencies operating on frequencies outside the common VHF High Band spectrum will be resolved using available technologies. MEMA will help provide technical guidance to determine the best practical technical solutions, help with implementation of technological solutions and will provide assistance with grant applications and obtaining funds from other sources when applicable and available.

7. Non-traditional public safety agencies will have communications capabilities with first responders through the Incident Commander.

8. The selection and use of CONOPS channels will be determined by the Incident Commander.

9. When multiple units are engaged in a common incident, talk-around channels should be implemented.

D. Central Maine Power Emergency Communications Plan

Central Maine Power (CMP) has a fully functional backup control center that is capable of operating independently of the primary facility. CMP has a procedure used for evacuation of the energy control center and the transfer of control to the backup control center. The room configuration includes positions for the system and area operators as well as a computer/staff, and communications rooms. A second fiber link is currently under construction to provide full redundancy.

The continuation of reliability functions during the interim period of an evacuation is part of the procedure for evacuation of the energy management control center. ISO-NE and Bangor Hydro Electric are notified of any evacuation, so that they are aware of CMP's inability to monitor the system. Bangor Hydro Electric will take direct responsibility of its 345 kV system and equipment.

The backup control center does not have a map-board but utilizes CAD drawings in addition to EMS one-line displays. A process is being developed to ensure that the backup control center has all current CAD drawings available.

Training is provided to the system operators semi-annually on evacuation to the backup control center, and a report is generated for each evacuation drill, which includes a review and critique of the drill. The trainer will follow up to ensure that any issues observed are addressed and eliminated prior to subsequent drills.

E. ISO- New England Outage Communication Plans

ISO-NE is responsible for regional outage coordination. Transmission equipment outages are processed in accordance with ISO-NE guidelines. Both the ISO-NE and the LCCs have the authority to approve, cancel, or defer outages. Request for transmission outages 69 kV and above are required to go through the ISO-NE reliability coordinator when a transmission outage has any impact or the first contingency has potential impact on a neighbor.

CMP utilizes the ISO-NE outage scheduler and the CMP application calendar to coordinate outage scheduling. Outage applications are received from the field via e-mail. The application is checked against the application calendar (jobs already scheduled) for conflicts. The application is cross checked with the Generator Annual Maintenance Schedule for conflicts. If the outage has any impact on neighboring systems, the affected neighbors are contacted by telephone, and the application is reviewed in detail. If it is agreed the application should proceed, the application is entered into the Long Term Transmission Plan and ISO-NE outage scheduler along with the load flow results and the contingency analysis.

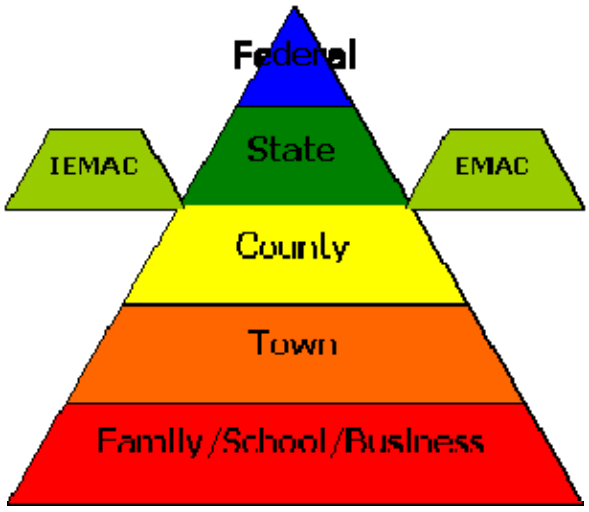
Relaying and voltage control equipment are processed through the full outage coordination process. Telemetering and computer outages are processed according to ISO-NE's maintenance procedures for communications, computers, metering, and computer support equipment.

14. Linkage to Other Response Plans and Procedures

The DHS, DOE and FBI are developing national emergency response plans and frameworks and offer assistance to the states in terms of grants, technologies and connection to emerging situational awareness networks. The State of Maine is developing its own emergency response networks and energy supply disruption tracking systems to feed information to the emergency response system in near real time. The sections below describe present response planning groups and their interactions.

A. MEMA Emergency Response Framework

Emergency response starts with each individual. Disaster-resilient neighborhoods and communities begin with families, workplaces and schools that are prepared for, and know how to respond to, any emergency.



In Maine, response begins locally. Each community has organizations and volunteers that respond, often structured around the local fire department. There is also an extensive network of mutual aid between communities in Maine.

Communities whose resources are overwhelmed reach out to their County Emergency Management Agency for assistance. Counties can help coordinate with communities farther away, or appeal to the State for resource assistance.

As part of that coordinated assistance, Maine is developing a regional response system, served by trained Incident Management Assistance Teams (IMATs).

The State relies on its Emergency Response Team to coordinate state-level resources. Maine can now reach out to almost all of the other states, through the Emergency Management Assistance Compact (EMAC) and to the eastern Canadian provinces (IEMAC), for response assistance.

The sixteen counties of Maine each have their own county emergency management agencies. Each of these county emergency management agencies is becoming linked through the work ongoing through a Public Safety Interoperability Communications Grant.

Maine is now integrating their Emergency Response organizations (MEMA, County Emergency Response Agencies, and local emergency response directors) into FEMA and DHS national plans. The integration of FEMA and NIMS of DHS is described in detail at the FEMA website: www.fema.gov/emergency/nims/.

The MEMA has received funding from DHS to develop a Communications Asset Mapping Tool (CASM), which defines the various radio communications resources available in the State.

B. Task Forces

Maine Task Forces will be especially useful in an energy related or other type of emergency.

- A Pre-Emergency Energy Task Force (PEETF) convenes in anticipation of an energy emergency and has the responsibility to investigate escalating heating oil, gasoline and diesel prices in the State of Maine, and make action recommendations. In the event that the Governor formally declares an energy emergency, the PEETF will then be informed of MEMA's response as it carries out its own management plan, the State Emergency Operations Plan (EOP). Specifically, the PEETF would have pre-identified fiscal, personnel and physical resources and provided for the development an Emergency Task

Force (ETF) to assist and inform MEMA's Emergency Response Team (ERT). Because energy situations are dynamic, this plan addresses the need for timely information and flexibility. In an acute emergency that does not allow time to convene a PEETF or an ETF, MEMA will have to act without the assistance of a formal ETF. In a sudden and severe energy emergency that overwhelms the state's ability to respond, the Governor would immediately request federal assistance and the ERT would then work with federal agencies and the private sector through the Energy Annex (Emergency Support Function #12) of the National Response Framework.

- The Energy Task Force (ETF) can be mobilized by the Governor or the Governor's Energy Office. The ETF serves in a situation assessment and planning role. In a declared energy emergency, the ETF provides technical support to the Emergency Response Team (ERT), which is managed by MEMA. Although the formation of a task force subset may help focus ERC's involvement, authority for planning and response should clearly reside with MEMA, especially in an acute emergency. The ETF's composition will be tailored to the event. The ETF should include decision-making representatives from State agencies relevant to the emergency, and it should be expanded as appropriate to include relevant industry, county government, local government, and nonprofit participants. The ETF will provide technical assistance, advice, and support to the ERT and to the Governor's office. It will facilitate communication and information sharing. The ETF will be led by the Director of the Governor's Energy Office and will expand on a situation-specific basis to include industry participants and local, regional, or federal government. Where the ETF is not expanded to county or local officials, MEMA's ERT will share ERT contact information with the ETF, as appropriate.

- Public-private cooperation can also be invaluable for getting information to the public quickly and affordably. Potential industry participants are utilities, generation plant owners, liquid fuels distributors and brokers, pipeline representatives, and trade associations. Up to date contacts for energy industry participants are available from the PUC and Governor's Energy Office. Other potential task force participants include county and municipal governments, the American Red Cross, and other assistance agencies and organizations. Participants may include members of MEMA's ERT as well as members of VOAD (Voluntary Organizations Active in Disaster); ERT and VOAD member lists are available from MEMA.

C. Maine Disaster Assistance Team


Gov. LePage

Recovery from an Energy Emergency is inextricably linked to response. Indeed, restoring normal energy supplies begins within the early phases of response functions. The Governor of Maine established the Disaster Assistance Team by executive order as early as 2005. This team consists of the following:

- Governor's Office
- Department of Defense, Veterans and Emergency Management
- Maine Emergency Management Agency
- Department of Health and Human Services
- Department of Economic and Community Development
- Department of Agriculture
- Department of Transportation
- Department of Labor or designee
- State Planning Office
- Maine State Housing Authority
- Bureau of Insurance
- Finance Authority of Maine
- Consumer Protection Division of the Attorney General's Office
- Small Business Administration
- Maine Volunteer Organizations Active in Disaster (VOAD)
- American Red Cross

The MEMA Director is designated as the Chair of the Committee and additional committee may be added with the approval of the Governor.

The MEMA web site concentrates more on "response" and less on "preparedness, mitigation, and recovery." This is perhaps appropriate for an emergency management organization. It also points up an area that could well benefit from improved explicit linkages. Each function in the energy and other emergency response organization requires resources and will be operating during an emergency. If forward planning were incorporated into how preparedness could enhance the capabilities of mitigation and response and how response could enhance the recovery efforts, then a global optimization of energy emergency actions could occur, to the benefit of the State and its citizens.

An example of this is how renewable energy is incorporated into the preparedness plan. Renewable energy will in itself, by nature of its intermittent operation, require different metrics for power system operation. Thus renewable energy supply nodes require their own maintenance and control centers. These centers could and should supply work force, parts and backup emergency communication capabilities to the State emergency response teams and ideally provide storage (since a key to effective renewable energy incorporation into the power grid is the ability to store energy) and provide backup energy supply to aid response and recovery operations.

The State of Maine is also, under DHS support, implementing a *"State of Maine Communications Interoperability Plan (SCIP)".* This plan not only links and inventories radio communications resources but also brings Maine communications systems into compliance with national narrowband radio standards. Narrow banding allows more channels and redundancy of channels to be available in the fixed bandwidth available.

D. State of Maine Emergency Plan

The Energy Task Force would participate in response activities. Response activities, where relevant, would involve implementation of the State Emergency Operations Plan (EOP), which defines operational procedures for all types of hazards and is administered by the Maine Emergency Management Agency in emergency situations. The EOP is organized by function, identifying those steps necessary to carry out direction and control, alerting and warning, resource management, evacuation, mass care, emergency public information, etc.

Any assignment of lines of succession, designation and protection of primary and alternate operational sites, and preservation of records will be conducted in accordance with Maine's State Emergency Operations Plan and applicable county and local plans.

E. Other States' Energy Emergency Plans

Maine may coordinate its energy emergency activities with those of other Northeast states and eastern Canadian provinces. The New England ISO, the New England Governors' Conference, the National Association of State Energy Officials, the Conference of New England Governors and Eastern Canadian Premiers, the Northeast International Committee on Energy, the New England Governor's Power Planning Committee, the Coalition of New England Governors, the New England Conference of Public Utility Commissions, and the U.S. Department of Energy are a few of the organizations available for inter-jurisdictional coordination.

15. Linkage to Non-Government Private Sector Response Plans and Procedures

Energy assurance is a critical issue to all citizens in this information driven age. The rise of personal technologies such as smart phones and tablet computing, along with electric vehicles and telecommuting work styles will make it more so. The State, the energy producers, the sixteen counties, and cities (such as Falmouth) and special energy interest groups are developing energy assurance plans. Corporations have long had their own backup energy supply and assurance plans. Modern computer equipment is very sensitive to power surges and the quality of electrical power (described by well known metrics) is often just as important as its quantity. Non-government groups such as the Red Cross have been and are integral parts of the emergency response plans. Future energy assurance planning would benefit by being aware of these disparate groups and sharing information and resources as much as possible.

A. ISO-NE Procedures

When to shift from preparedness to response will necessarily be situation-specific, and any transition must dovetail with ISO New England's Operating Procedures and federal agency procedures through the National Response Framework. Detailed descriptions of the National Response Framework Emergency Support Function 12 Energy Annex and the relevant ISO-NE Operating Procedures are in Appendix A and J respectively.

B. Natural Gas Procedures

The manner in which a state agency works with a gas company depends upon the legal authorities in place. A state may:

- Review gas company emergency plans
- Review county and municipal natural gas emergency plans
- Make public warnings and announcements
- Assist in the arrangement of special gas purchase contracts
- Issue requests for a reduction in gas use
- Implement gas demand reduction measures at State facilities
- Declare a state of emergency
- Implement measures similar to those for petroleum emergencies
- Establish notification protocols
- Request federal assistance
- Take investigative and/or enforcement measures.

The curtailment plans in Maine are part of the LDC's tariff filing. Curtailment priorities are placed on protecting human health and safety and are implemented to ensure continued service to residential customers and other critical loads. With respect to natural gas for electricity generation, electric generators without contracts for firm gas supply will not have access to gas supply during shortage events, such as occurred in December of 2007.

Emergency steps that gas companies take during a shortage include:

- Purchasing and transporting additional gas.
- Rerouting gas deliveries.
- Increasing withdrawals from storage.
- Increasing withdrawals from other operating system sources.
- Increasing pipeline pressure.
- Issuing public warnings and announcements.
- Requesting that customers voluntarily reduce gas demand.
- Arranging for import of compressed natural gas or liquefied petroleum gas.
- Interrupting selected customers.
- Developing strong public/private relationships with the leaders in the natural gas production, transmission, and distribution industries;
- Implementing gas cutoffs.
- Taking investigative and/or enforcement measures.

C. The Red Cross and Army Corps of Engineers

Two players who need to be considered in energy assurance and response planning are The American Red Cross and the Army Corps of Engineers.

The Red Cross is usually first on the scene and provides emergency assistance before the arrival of State and federal officials. The Red Cross also coordinates the assistance activities of other volunteer organizations.

The Army Corps of Engineers is crucial for three functions:

1. Freeing up waterways and roads and dealing with flooding
2. Providing emergency Generators for emergency backup power

3. Aiding in the logistics of emergency recovery and rebuilding of civic infrastructure

The Red Cross, and when appropriate the DOE OE emergency response group often coordinate the activities of the Army corps to provide emergency assistance and especially the diesel generators needed to supply emergency response operations with electrical power and diesel fuel.

D. National Disaster Recovery Framework Suggested Linkages

It is critical that disaster recovery officials recognize the importance of partnership and create coordination opportunities during pre-disaster planning with private sector leaders. The resources and capabilities of the private sector, including utilities, banks, and insurance companies, can play an important role in encouraging mitigation and creating greater resilience in a community.

Since the NDRF stresses pre disaster planning as the key to disaster recovery, the role of the private non-government sector should be incorporated in any energy assurance and emergency response plan.

In addition to the private non-governmental sector, the nonprofit sector provides unique and valuable contributions to community stability and continuity during energy and other emergencies. They often couple down to the individual level and stay behind after emergency response teams leave. Thus, they need to be included in energy assurance and emergency response planning tool.

16. Legal Authority for Emergency Response

A. Legislative and Regulatory Policy

Several new laws in Maine are taking steps to achieve the state's clean energy goals. Maine has been working to build its clean energy infrastructure by pushing weatherization and other green initiatives. For example, in 2009, the state passed a comprehensive energy package which established several clean energy goals including weatherizing all residences and 50 percent of businesses by 2030, reducing the state's consumption of fossil fuels, creating 3000 megawatts of wind energy by 2020 and consolidating all energy efficiency programs under a single umbrella.

B. Key Energy Policies

- **Renewable Portfolio Standard** – Maine's Renewable Resource Portfolio requirement (35-A M.R.S. § 3210) requires each competitive electricity provider, including standard offer providers, to supply at least 40% of their total retail electric sales from renewable energy and certain energy efficiency resources by 2017, of which 10% must be from new resources. To qualify, electricity must be generated by a facility no greater than 100 MW, and come from fuel cells, tidal power, solar arrays and installations, wind power, geothermal power, hydropower, biomass power or generators fueled by municipal solid waste in conjunction with recycling. (See Appendix T for more information on the *Renewables Portfolio Standard*)

Maine's Wind Power Bill (based on recommendations of the Ocean Energy Task Force) set an 8,000-MW wind power goal by 2030, 5,000 MW of which must come from coastal waters or off-shore.

Utilities may pay an alternative compliance payment (ACP) instead of meeting portfolio requirements. ACP income supports the Renewable Resource Fund, the state's public benefits fund. As of 2009, approximately $800,000 is collected for the fund from the two sources.

- **Net Metering** – All of Maine's electric utilities, including investor-owned utilities (IOUs) and consumer-owned utilities (COUs) must offer net metering for individual customers. IOUs must offer net metering to eligible facilities with capacity limits up to 660 kilowatts (kW), while COUs must provide net metering to customer generators up to 100 kW. Net excess generation is credited to the following month for up to 12 months, at which point any remainder is granted to the utility.
- **Property Assessed Clean Energy (PACE) Financing** – Maine has authorized local governments to establish, and use federal fund to establish PACE programs to assist residences and businesses to make energy improvements to their homes and buildings.
- **Offshore Renewable Energy Development Support** – In 2009, Maine and the Federal Energy Regulatory Commission (FERC) signed an agreement to streamline federal and state licensing process for offshore wind and ocean energy projects that is the first agreement of its kind on the East Coast. Maine also designated offshore testing zones for rapid license approval for offshore testing platforms within state waters.

C. Legislation

Household electricity and heating consumption are regulated through federal and state laws. These laws define standards that are important for safety, health, and energy conservation. Additionally, Maine has made greenhouse gas emissions a politically important issue through state laws and actions.

Federal Laws

Federal laws related to home electricity use, home heating, and energy supply are summarized in *Table 1.1*. Consumer rights in federal laws are protected through regulations preventing utility monopolies. Additionally, the federal government attempts to protect consumers through social services programs managed through individual states. There are no federal laws regulating or directly related to greenhouse gas emissions, but renewable energy production is promoted for energy independence reasons by several laws.

Table 1.1

Federal Laws Relating to Residential Energy Use, Residential Space Heating, and Renewable Energy

Law	Year	Description	Location
Federal Power Act	1920	Created the Federal Energy Regulatory Commission (FERC).	USC Title 16 Chapter 12 §791-825u
Public Utility Holding Company Act (PUHCA)	1935	Prevents monopolies of utility companies and protects the consumer from high prices.	USC Title 15 Chapter 2C §79 - 79z-6
Natural Gas Act	1938	Gives FERC authority to set rates for transmission of natural gas in interstate commerce.	Pub. L. 75-688
Energy Policy and Conservation Act	1975	Set appliance efficiency targets.	USC Title 42 Chapter 77 §6201-6422
Department of Energy Organization Act	1977	Created the United States Department of Energy.	USC Title 42 Chapter 84 §7101-7386k
Public Utility Regulatory Policies Act (PURPA)	1978	Promotes renewable energy and energy conservation. Improves utility distribution.	USC Title 16 Chapter 46 §2601-2645
Natural Gas Policy Act	1978	FERC has authority over gas production. Established price ceilings for natural gas.	USC Title 15, Chapter 60, §3301-3432
Natural Gas Wellhead Decontrol Act	1989	Removed all price ceilings for natural gas.	
Energy Policy Act	1992	Building efficiency standards. Framework for wholesale electricity markets. Increases small-scale energy production opportunities.	USC Title 42 Chapter 91 §8201-8287d
Energy Policy and Conservation Act Reauthorization	2000	Northeast Home Heating Oil Reserve creates oil reserve to stabilize price and ensure supply.	USC Title 42 Chapter 77 §6201-6422
Energy Policy Act	2005	Repealed PUHCA and created a new PUCHA. Provides funding for certain renewable energy projects. Promotes expansion of current energy production.	USC Title 42 Chapter 134 §13201-13574
Energy Independence and Security Act	2007	Efficiency standards for heating equipment, appliances, and lighting. Funding for biofuel production.	Pub. L. 110-140

In addition, the following federal regulations may be relevant in some situations:

- **Facility Response Plans** (marine transportation) (59 FR 34070).
  Focusing on oil spill prevention, preparedness, and response, the Spill Prevention, Control, and Countermeasure (SPCC) rule is designed to protect public health, public welfare, and the environment from potential harmful effects of oil discharges to navigable waters and adjoining shorelines. The rule requires facilities that could reasonably be expected to discharge oil in quantities that may be harmful into navigable waters to develop and implement SPCC Plans.

- **Facility Response Plans for Pipelines** (62 FR 13991).
  This Notice to Lessees and Operators and Pipeline Right-of-way Holders (NTL) provides for sub-regional Oil Spill Response Plans (OSRP's). The notice also reminds operators of their responsibilities to review and update their oil spill response plans and to comply with other emergency response requirements so as to ensure the necessary response to a worst case discharge from their pipeline facility.

- **Escorts for Certain Tankers** (59 FR 42962).
  This rule requires U.S. Coast Guard escorts for certain tankers during foul weather. The escort vessels can reasonably be expected to safely bring the tanker under control within the navigational limits of the waterway. It requires the tanker to be operated within the performance envelope of its escorts, relative to the limits of the waterway and in consideration of the transit conditions (wind and sea). Thus, this requirement is both waterway-specific and transit condition-specific.

- **Establishment of Double Hull Requirements for Tank Vessels** (60 FR 13318).
  The Coast Guard established regulations for the construction and retrofitting design standards of double hull vessels pursuant to the requirements of the Oil Pollution Act of 1990. The Act applies to all oil-carrying vessels in U.S. waters, including foreign vessels.

- **National Contingency Plan Revisions** (59 FR 47384).
  The NCP is the Federal Government's blueprint for responding to oil spills and hazardous substance releases. It documents national response capability and is intended to promote overall coordination among the hierarchy of responders and contingency plans. The plan places responsibility for command and control in managing serious disaster response with the U.S. Federal government. Designated On-Scene Coordinators direct all federal, state, and private response activities at the site of a discharge.

- **Facility Response Plans for Marine and Non-Marine Transport Facilities** (61 FR 7890).
  The rule establishes regulations requiring response plans for marine transportation-related (MTR) facilities including deepwater ports, certain Coast Guard regulated onshore facilities, marinas, tank trucks, and railroad tank cars. The purpose of requiring facility response plans is to enhance private sector planning and response capabilities to minimize the environmental impact of spilled oil.

Utility Regulation

The Federal Power Act created the Federal Energy Regulatory Commission (FERC) in 1920. FERC regulates electricity, oil, and natural gas distribution among states. In Maine, FERC is actively involved in permitting and regulating hydropower dams, because hydroelectric facilities generate around 30% of Maine's electricity. Additionally, FERC provides licensing to energy sources such as natural gas. The Natural Gas Act gave FERC the authority to set rates for transmission of interstate natural gas and allowed FERC to issue permits letting companies charge customers for a percentage of the pipeline construction costs (Pub. L. 75-688 1938). Maine receives the majority of its natural gas from out-of-state sources and these rates are therefore regulated by FERC.

The Natural Gas Policy Act granted FERC the authority to regulate intrastate natural gas production, in addition to interstate transmission. It also established natural gas price ceilings. As a result, FERC has authority over all natural gas production and sale in the state of Maine.

Utility companies were also regulated from 1935 to 2005, by the Public Utility Holding Company Act (PUHCA). The Act was intended to protect consumers by preventing unnecessarily high energy prices that could result from monopolies. PUHCA was also designed to stabilize often volatile energy prices. The Energy Policy Act of 2005 revised PUHCA to give FERC the right to access utility company records. At the same time, the Energy Policy Act also increases funding for certain renewable energy projects and expands oil, coal, and nuclear energy generation. In addition, the act encourages utilities to improve and increase generation and transmission infrastructure (Lookadoo 2008, Public Citizen 2005).

Consumer Protection

The federal government has created multiple social services programs attempting to help citizens who cannot afford their heating or electricity needs. In 1976, the US Department of Energy (DOE) founded the Weatherization Assistance Program (WAP). The program is run by individual states and DOE provides funding and technical assistance. WAP implements energy efficiency measures in low-income homes to reduce energy bills, providing savings to millions of families.

The Low Income Home Energy Assistance Program (LIHEAP), provides low income families with financial assistance for the purchase of heating and electricity. Congressional funding is distributed annually through states, who then distribute funding to homeowners. The state government implements this program through the Maine State Housing Authority.

The federal government found that citizens in the Northeast required a greater safety net against unstable heating prices than previous programs could provide. The Energy Policy and Conservation Act created the Northeast Home Heating Oil Reserve. This reserve was intended to provide a more stable supply and price of oil for the millions of customers in the Northeast region.

Consumer Home Heating Rights – 2008

During the winter months home heating fuel is a necessity to Maine consumers. In Maine, sellers of home heating oil, LP gas, natural gas, electricity and firewood are held to higher legal standards than most merchants. These standards include:

1. Home Heating Oil

The Attorney General has issued Rules under the Maine Unfair Trade Practices Act1 that regulate, from October 15 through April 30, the sale of home heating oil. These Rules give consumers the right to purchase home heating oil even if that consumer owes the dealer money.

2. LP Gas (Propane)

Pursuant to the Maine Unfair Trade Practices Act, consumers have the right to purchase home heating LP gas even if that consumer owes the dealer money.

3. Firewood

There are specific statutory protections2 for purchasers of firewood. These statutes define a "cord" and require that firewood dealers provide consumers with a receipt.

4. Natural Gas & Electricity

The Maine Public Utilities Commission has issued Rules for utilities that provide natural gas or electricity. These Rules protect consumers and regulate service and prices.

Failure to follow these laws and regulations may be an unfair trade practice, in violation of 5 M.R.S.A. § 207. Intentional violations of the Unfair Trade Practices Act can result in a civil penalty of up to $10,000. Consumers can bring private unfair trade practice action3 and receive damages or any lost money and their lawyer's fees.

Consumer Rights Under The Attorney General Home Heating Oil Rules

The Attorney General has issued rules that regulate the sale of home heating oil during the winter months, from October 15 through April 30. An oil dealer cannot refuse to deliver to a consumer even if they owe the dealer money, provided these three conditions are met:

1. The consumer has cash or government guaranteed payment to pay for the oil you are requesting;
2. The dealer regularly serves the consumer's area; and
3. The customer requests at least 20 gallons.

The dealer's surcharge cannot exceed the actual cost incurred by making an unscheduled delivery. (See Appendix W for more details on Consumer Home Heating Rights.)

State Laws

Maine has passed several laws in the last decade devoted to electricity generation with a focus on moving away from non-renewable resources. The following is only a sample of Maine laws that address energy assurance and is not inclusive of all such statutes.

- In 1996, Maine passed the Restructuring Act requiring that the wholesale generation of electric energy be separated from the transmission of electricity. This deregulation of Maine's utilities required power companies to sell off their generation assets so that Maine consumers can purchase competitively priced energy. Renewable portfolio standards were also part of this bill, requiring 30% of all electricity generation to come from renewable resources (MRS Title 35-A Chapter 141 §6 1997).

- In 2007, An Act to Stimulate Demand for Renewable Energy was passed, creating a renewable portfolio goal to increase new renewable energy capacity 10% by 2017 (MRS Title 35-A Chapter 403 §3210-3212 2007).

- Maine signed onto the Regional Greenhouse Gas Initiative (RGGI) in 2007, requiring Maine to stabilize and then reduce greenhouse gas emissions from the power generation industry 10% below 2009 levels by 2019 (MRS Title 35-A Chapter 317 §3211-A 2007).

- Maine has also passed acts supporting both solar and wind power development within the state.

- An Act to Implement Recommendations of the Governor's Task Force on Wind was passed in 2007 to encourage the development and sighting of appropriate wind energy production in Maine. It also set ambitious goals for the role of wind power in Maine, calling for 2,000 megawatts (MW) of wind power capacity by 2015 and 3,000 MW of wind power capacity by 2020 (MRS Title 35-A Chapter 661 §3401-3404 2007).

The following table, Table 1.2, reflects Maine State Laws as they relate to residential use, space heating and greenhouse gas emissions.

Table 1.2
State Laws Relating to Residential Energy Use, Residential Space Heating and Greenhouse Gas Emissions

Law	Year	Description	Location
Unfair Trade Practices	1969	Unfair or deceptive acts or practices in the conduct of any trade or commerce is declared unlawful	MRS Title 5 Chapter 10 § 207
An Act to Restructure the State's Electric Industry	1997	Each investor-owned electric utility required to divest all generation assets and business activities. Created 30% renewable portfolio standards.	MRS Title 35-A Chapter 141 §6
An Act to Establish the Regional Greenhouse Gas Initiative Act of 2007	2007	Binds Maine to stabilizing and reducing greenhouse gas emissions from the power industry to 10% under 2009 levels.	MRS Title 35-A Chapter 317 §3211-A
An Act to Implement Recommendations of the Governor's Task Force on Wind Energy	2007	Expedites wind permitting applications, sets goals of 2000 MW of wind power capacity by 2015, 3000 MW by 2020.	MRS Title 35-A Chapter 661 §3401-3404
An Act to Stimulate Demand for Renewable Energy	2007	Creates a renewable portfolio goal to increase new renewable energy capacity by 10% by 2017.	MRS Title 35-A Chapter 403 §3210-3212
An Act to Lower Energy Costs and Increase Renewable Energy in Maine	2008	Supports net energy billing, allows utilities to charge more for energy use at peak times, and gives money to state energy efficiency programs.	MRS Title 35-A Chapter 183 §3210-E, §1415-J, §4722
An Act to Protect Electricity Consumers of Northern Maine	2008	Removes state-granted right of eminent domain for transmission lines that adversely affect utility ratepayers.	MRS Title 35-A Chapter 575 §3132

State Energy Emergency Laws

The following additional legal references are particularly relevant to energy emergency preparedness and response:

- *Energy Emergency Proclamation (37 MRSA 742).* The Governor has authority to proclaim an energy emergency and, in cases of an emergency, powers to implement or waive certain programs, standards, priorities and quotas.
- *Profiteering in Necessities Act (10 MRSA §1105).* Prohibits price gouging in the event of extreme market dislocation (e.g. during an energy shortage.)
- *Maine Unfair Trade Practices Act, (5 MRSA §§205-A-214)* under which the Attorney General must prove that the challenged pricing was "unconscionable excessive."
- *An Act to Provide for the Security of Certain Utility Information (35A MRSA §1311B).* This Act allows the Public Utilities Commission to restrict access to specific information about public utility operations that could compromise the security of public utility systems and to release that information to other State agencies for use in emergency preparedness or response, law enforcement and other public health and safety activities.
- *Maine Monopolies and Profiteering Law, (10 MRSA §§1101-1109)* prohibits the abuse of monopoly power, price fixing and other unreasonable restraints of trade, among other things.

Other State Energy Laws

Other energy bills recently signed into law include:

- L.D. 1786, An Act Regarding Energy Infrastructure Development;
- L.D. 1535, An Act to Create a Smart Grid Policy in the State;
- L.D. 1717, An Act to Increase the Affordability of Clean Energy for Homeowners and Businesses;

- L.D. 1504, An Act to Provide Predictable Benefits to Maine Communities That Host Wind Energy Developments;
- L.D. 1810, An Act to Implement the Recommendations of the Governor's Ocean Energy Task Force.

Smart Grid – State Legislative & Policy Action Review

Regulatory:

Smart Grid Coordinator

Background: In compliance with Maine's Smart Grid Policy Act 2010, the Commission began in September 2010 an investigation "to determine whether it is in the public interest to have one or more smart grid coordinators in the State." If the Commission decides that the role of smart grid coordinator is indeed in the interest of the state, then it will address the formation of standards. Such standards may include: "Eligibility, qualification and selection criteria"; "Duties and functions"; "The relationship between a smart grid coordinator and a transmission and distribution (T&D) utility"; "Access to information held by the smart grid coordinator by 2nd and 3rd parties"; and "Data collection and report." In October 2010, the Commission Staff circulated a draft list of issues and solicited Comments. Commission issued the final list after Comments were filed. In December 2010, parties to proceeding filed direct cases. A Technical Conference was held in February 2011. Another Technical Conference was held in June 2011.

January 2012: The Commission published a report summarizing and assessing the information collected so far through the proceeding. It cites filings from parties to the proceeding as well as "literature about smart grid capabilities and implementation." The report, "Investigation into Needs and Standards for a Maine Smart Grid Coordinator," was developed by the National Regulatory Research Institute at the Commission's request. The report recommends that the Commission "should continue its efforts to begin implementing dynamic pricing"; "should not authorize cost recovery for any smart grid facilities that provide customer end-use services unless those facilities use open-systems protocols and can be made available at cost to competitive service providers"; and "should not assume that the T&D company is best suited to smart grid roles involving consumer education and consumer end use."

Smart Metering Opt-Out

Background: Via a January 2011 Notice of Proposed Rulemaking, the Commission launched an investigation of Central Maine Power's (CMP) smart meter initiative following a series of complaints filed about it. The investigation was to "determine if the alleged position of CMP (of providing no opt-out option in the Smart Meter program installation) is 'unreasonable, insufficient or unjustly discriminatory' in the context of the existing Commission Order" approving the project. (CMP's smart meter deployment was initially approved by the Commission in February 2010.) The Commission later consolidated this proceeding with several other proceedings. In January 2011, CMP filed three scenarios for how to address RF concerns. In April 2011, Commission Staff filed analysis of and recommendations for allowing customers to opt-out of smart metering. In May 2011, the Commission issued an Order directing CMP to allow customers to opt-out of smart metering. CMP must offer two opt-out options: (1) using an already-installed smart meter "with its transmitter turned off" and (2) keeping an existing analog meter. Further, customers choosing to opt out must pay "the associated costs of that option."

June 2011: The Commission issued "Part II" of its Order directing CMP to allow customers to opt-out of smart metering. Part II of the Order describes the Commission's analysis of the issues and the reasoning for its decision.

July 2011: Two Motions to Reconsider or to Clarify were filed. One Motion was filed by the Maine Office of the Public Advocate (OPA) and the other by a private citizen. These Motions were filed in response to the Commission's Order directing CMP to allow customers to opt-out of its smart metering program

July 2011: The Commission issued a Procedural Order through which it asked CMP to comment on the two Motions to Reconsider or to Clarify.

July 2011: CMP filed Comments, urging the Commission "to reject both requests [the Motions to Reconsider or to Clarify] as they are without merit."

August 2011: The Commission initiated a new proceeding following the filing of a complaint against CMP's smart metering. The complaint was signed by 19 customers of CMP. The 19 complainants petitioned the Commission to "stay the installation of further smart meters" or to "order future installations to be Opt In."

August 2011: The Commission issued an Order granting the Motion to Reconsider or to Clarify that was filed by the Office of Public Advocate. The Commission directed CMP "to provide written notice to all of its customers of its smart meter program and customer opt-out options."

August 2011: The Commission issued an Order dismissing the complaint against CMP's smart metering, which had been filed by 19 customers of the utility.

October 2011: The group that filed the complaint against CMP appealed the Commission's August 2011 Order by filing a notice of appeal with the Maine Supreme Judicial Court.

Smart Metering Cybersecurity and Privacy Report

August 2011: The Commission initiated this proceeding.

December 2011: The Commission issued a draft of its "Report on Cyber-Security and Privacy Issues Relating to Smart Meters." The report considers cybersecurity and privacy relative to Central Maine Power's (CMP) and Bangor Hydro Electric's (BHE) smart metering efforts. It also considers NIST's Smart Grid Interoperability Panel, the DOE's Cyber Security Initiative, and NERC's Critical Protection Standards (CIPs). Finally, the report reviews existing Commission rules regarding privacy. The Commission is developing the report pursuant to state law enacted in June 2011 ("An Act to Limit the Use of Smart Meters," LD 756, HP 563).

January 2012: Comments filed.

October 2011: Opponents of smart metering filed a Notice with the Maine Supreme Court appealing the Maine Public Utility Commission's August 2011 dismissal of a complaint against Central Maine Power's smart metering program.

May 2012: The Maine Supreme Court heard Oral Arguments. The Supreme Court's synopsis of the case is:

> *"Ed Friedman appeals from the Maine Public Utilities Commission's dismissal of his complaint, which addressed several issues regarding the use of smart-meter technology by Central Maine Power Co. Friedman asserts, among other issues, that the Commission erred because its dismissal of his complaint ignored the Commission's statutory mandate to ensure the delivery of safe and reasonable utility services, failed to consider relevant case law, and because the Commission failed to conduct a full investigation of the issues raised in the complaint. The Commission and Central Maine Power Co. contend that the complaint was properly dismissed."*

Legislative:

Load Management Bill

Background: Legislation was introduced in March 2011. The bill would extend “existing standards for energy savings design considerations” for new or renovated state buildings “to include cost-effective load management systems.” Among other things, it also would expand “counties' ability to contract with energy service companies to achieve energy savings to include load management systems.” In June 2011, Maine’s House and Senate passed the bill and sent it to the governor.

January 2012: Governor La Page vetoed bill.

17. APPENDICES

Appendix A: Emergency Support Function Annex for ESF#12

Emergency Support Function #12 – Energy Annex

January 2008 ESF #12 – Energy Annex ESF #12-1

ESF Coordinator:

Department of Energy
Primary Agency:
Department of Energy

Support Agencies:
Department of Agriculture
Department of Commerce
Department of Defense
Department of Homeland Security
Department of the Interior
Department of Labor
Department of State
Department of Transportation
Environmental Protection Agency
Nuclear Regulatory Commission
Tennessee Valley Authority

INTRODUCTION

Purpose

Emergency Support Function (ESF) #12 – Energy is intended to facilitate the restoration of damaged energy systems and components when activated by the Secretary of Homeland Security for incidents requiring a coordinated Federal response. Under Department of Energy (DOE) leadership, ESF #12 is an integral part of the larger DOE responsibility of maintaining continuous and reliable energy supplies for the United States through preventive measures and restoration and recovery actions.

Scope

ESF #12 collects, evaluates, and shares information on energy system damage and estimations on the impact of energy system outages within affected areas. Additionally, ESF #12 provides information concerning the energy restoration process such as projected schedules, percent completion of restoration, and geographic information on the restoration. ESF #12 facilitates the restoration of energy systems through legal authorities and waivers. ESF #12 also provides technical expertise to the utilities, conducts field assessments, and assists government and private-sector stakeholders to overcome challenges in restoring the energy system.
The term “energy” includes producing, refining, transporting, generating, transmitting, conserving, building, distributing, maintaining, and controlling energy systems and system components. All energy systems are considered critical infrastructure.

Policies

ESF #12:

- Addresses significant disruptions in energy supplies for any reason, whether caused by physical disruption of energy transmission and distribution systems, unexpected operational failure of such systems, or unusual economic or international political events.

- Addresses the impact that damage to an energy system in one geographic region may have on energy supplies, systems, and components in other regions relying on the same system. Consequently, energy supply and transportation problems can be intrastate, interstate, and international.

- Performs the Federal coordination role for supporting the energy requirements associated with National Special Security Events.

- Is the primary Federal point of contact with the energy industry for information sharing and requests for assistance from private- and public-sector owners and operators.

- Maintains lists of energy-centric critical assets and infrastructures, and continuously monitors those resources to identify and mitigate vulnerabilities to energy facilities.

- Establishes policies and procedures regarding preparedness for attacks to U.S. energy sources and response and recovery due to shortages and disruptions in the supply and delivery of electricity, oil, natural gas, coal, and other forms of energy and fuels that impact or threaten to impact large populations in the United States.

Restoration of normal operations at energy facilities is the responsibility of the facility owners. For those parts of the Nation's energy infrastructure owned and/or controlled by DOE, DOE undertakes all preparedness, response, recovery, and mitigation activities.

CONCEPT OF OPERATIONS

ESF #12 provides the appropriate supplemental Federal assistance and resources to enable restoration in a timely manner.
Collectively, the primary and support agencies that comprise ESF #12:

- Serve as the focal point within the Federal Government for receipt of information on actual or projected damage to energy supply and distribution systems and requirements for system design and operations, and on procedures for preparedness, restoration, recovery, and mitigation.

- Advise Federal, State, tribal, and local authorities on priorities for energy restoration, assistance, and supply.

- Assist industry, State, tribal, and local authorities with requests for emergency response actions as required to meet the Nation's energy demands.

- Assist Federal departments and agencies by locating fuel for transportation, communications, emergency operations, and national defense.

- Provide guidance on the conservation and efficient use of energy to Federal, State, tribal, and local governments and to the public.

- Provide assistance to Federal, State, tribal, and local authorities utilizing Department of Homeland Security (DHS)/Federal Emergency Management Agency (FEMA)-established communications systems.

ORGANIZATION

Headquarters

ESF #12 is coordinated through Headquarters DOE. ESF #12 is activated when DHS/FEMA notifies the 24-hour Headquarters DOE Emergency Operations Center.

When activated by DHS/FEMA, ESF #12 provides representatives to the DHS National Operations Center, Domestic Readiness Group, and National Response Coordination Center (NRCC).

Regional-Level ESF #12 Support
ESF #12 assigns regional coordinators to each of the 10 DHS/FEMA regions. These coordinators attend meetings, participate in exercises, and develop expertise on regional issues and infrastructure.

ESF #12 participates in Regional Interagency Steering Committee preparedness and coordination activities.

When activated by DHS/FEMA, ESF #12 representatives deploy to the Regional Response Coordination Center (RRCC). The ESF #12 Team Leader at the RRCC coordinates assignments, actions, and other support until the Joint Field Office (JFO) is established and mission-execution responsibilities are transferred to the JFO ESF #12 Team Leader. ESF #12 provides incident-related reports and information to ESF #5 – Emergency Management.

Field-Level ESF #12 Support
When activated by DHS/FEMA, ESF #12 representatives deploy as members of incident management teams.

When activated by DHS/FEMA, ESF #12 representatives can also deploy as members of the Rapid Needs Assessment Team.

When activated by DHS/FEMA, ESF #12 personnel deploy to the JFO.

State, Tribal, and Local
State, tribal, and local governments have primary responsibility for prioritizing the restoration of energy facilities. State, tribal, and local governments are fully and consistently integrated into ESF #12 operations. When activated, ESF #12 personnel may deploy to State emergency operations centers.

Private Sector
ESF #12 coordinates information and requests for assistance with the following private-sector entities: the electricity and the oil and natural gas sector coordinating councils, the Electric Reliability Organization, and various associations that represent portions of the energy sector.

ACTIONS

Pre-incident
In cooperation with the Energy Sector, ESF #12 develops and implements methodologies and standards for physical, operational, and cyber security for the energy industry.
ESF #12 conducts energy emergency exercises with the energy industry, Federal partners, States, and tribal and local governments to prepare for energy and other emergencies.
The private sector owns and operates the majority of the Nation's energy infrastructure and participates along with the DOE in developing best practices for infrastructure design and operations.

DOE assists the States in the preparation of State Energy Assurance Plans to improve the reliability and resiliency of the Nation's energy systems.
ESF #12 works with the DHS/FEMA regions, the private sector, States, and tribes to develop procedures and products that improve situational awareness to effectively respond to a disruption of the energy sector.

DOE monitors the energy infrastructure and shares information with Federal, State, tribal, local, and industry officials.

In anticipation of a disruption to the energy sector, DOE analyzes and models the potential impacts to the electric power, oil, natural gas, and coal infrastructures; analyzes the market impacts to the economy; and determines the effect the disruption has on other critical infrastructure and key resources (CIKR).

Incident

The private sector normally takes the lead in the rapid restoration of infrastructure-related services after an incident occurs. Appropriate entities of the private sector are integrated into ESF #12 planning and decision-making processes.

Upon activation of ESF #12, DOE Headquarters establishes the Emergency Management Team and activates DOE disaster response procedures.

DOE assesses the energy impacts of the incident, provides analysis of the extent and duration of energy shortfalls, and identifies requirements to repair energy systems.

In coordination with DHS and State, tribal, and local governments, DOE prioritizes plans and actions for the restoration of energy during response and recovery operations.

ESF #12 coordinates with other ESFs to provide timely and accurate energy information, recommends options to mitigate impacts, and coordinates repair and restoration of energy systems.

ESF #12 facilitates the restoration of energy systems through legal authorities and waivers. DOE provides subject-matter experts to the private sector to assist in the restoration efforts. This support includes assessments of energy systems, latest technological developments in advanced energy systems, and best practices from past disruptions.

ESF #12 coordinates preliminary damage assessments in the energy sector to determine the extent of the damage to the infrastructure and the effects of the damage on the regional and national energy system.

Within the JFO, ESF #12 serves as the primary source for reporting of CIKR damage and operating status for the energy systems within the impacted area. The Infrastructure Liaison, if assigned, proactively coordinates with ESF #12 on matters relating to security, protection, and/or restoration that involve sector-specific, cross-sector, or cascading effects impacting ESF #12. (See the CIKR Support Annex for further details.)

Post-incident

ESF #12 participates in post incident hazard mitigation studies to reduce the adverse effects of future disasters.

ESF #12 assists DHS/FEMA in determining the validity of disaster-related expenses for which the energy industry is requesting reimbursement based upon the Stafford Act.

DOE leads and participates in various best practices and lessons learned forums to ensure future disruptions are addressed in the most efficient manner possible.
In coordination with the Pipeline and Hazardous Materials Safety Administration, ESF #12 ensures the safety and reliability of the Nation's natural gas and hazardous material pipelines.

RESPONSIBILITIES

Primary Agency: DOE

- Serves as the focal point for issues and policy decisions relating to energy response and restoration efforts.

- Assesses energy system damage and monitors repair work.

- Collects, assesses, and provides information on energy supply, demand, and market impacts; and contributes to situation and after-action reports.

- Identifies supporting resources needed to restore energy systems.

- Deploys DOE response teams as needed to affected area(s) to assist in response and restoration efforts.

- Reviews and sponsors the energy industry's requests for Telecommunications Service Priority (TSP) assignments to provision new services.

- Is the Sector-Specific Agency for the energy sector under Homeland Security Presidential Directive 7, "Critical Infrastructure Identification, Prioritization, and Protection."

SUPPORT AGENCIES

Agency	Functions
Department of Agriculture	**Rural Development (RD)** • Provides technical support and access to both damage assessments and restoration efforts for electric power generation, transmission, and distribution in Rural Development Utilities Program-financed systems. • Gathers and communicates information, as appropriate, from Rural Development Utilities Program-financed systems to assess impacts and needs. ● Provides information (location, type, owners, and/or management service) on available USDA-financed, habitable housing units in its inventory that are not under lease or under agreement of sale for response or emergency personnel and their organizations' representatives to contact for housing during response activities.
	Multifamily Housing: Identifies owners of available apartments in federally funded multifamily housing to provide shelter to emergency response personnel in the affected area.
Department of Commerce	**National Oceanic and Atmospheric Administration (NOAA)** ● Provides current and forecast weather information and dispersion model forecasts through its National Centers for Environmental Prediction and its local weather forecast offices and river forecast centers. ● Provides public dissemination of critical event information over the NOAA All Hazards Weather Radio system, NOAA Weather Wire Service, and Emergency Managers Information Network.

Department of Defense	**U.S. Army Corps of Engineers:** Coordinates Emergency Power team missions with power-system restoration activities to establish priorities for emergency generator installation.
Department of Homeland Security	**Office of Infrastructure Protection** ● Provides management of the National Infrastructure Protection Plan. ● Provides overall coordination of the Nation's CIKR mission area. ● Manages the National Infrastructure Coordinating Center, the National Asset Data Base, the National Infrastructure Simulation and Analysis Center and the Homeland Infrastructure Threat Reporting and Analysis Center (in coordination with DHS/Office of Information and Analysis). ● Manages a nationwide organization of Protective Security Advisors. ● Trains and deploys Infrastructure Liaisons and Advisors to support incident management activities. (See the CIKR Support Annex for further detail.) ● Develops and maintains a critical infrastructure list of energy facilities. ● Develops and maintains a critical assets list of energy facilities. ● Identifies and publicizes threats to specific energy facilities. ● Coordinates with DOE and the private sector to conduct vulnerability assessments on energy infrastructure associated with terrorism, and coordinates the implementation of protective measures. ● Through the Infrastructure Liaison, provides situational awareness and prioritized recommendations concerning the recovery and restoration of the associated CIKR sectors supported by this ESF.

Agency	Functions
Department of Homeland Security (Continued)	**National Communications System** ● Through ESF #2 – Communications, assists DOE in its efforts to aid the energy industry in providing new services or to restore existing services that are assigned TSP restoration priorities. ● Assesses damage to telecommunications identified by DOE as essential for energy system restoration (electrical service priorities).
	Science and Technology Directorate: Provides coordination of Federal science and technology resources.
Department of the Interior	**Bureau of Land Management** ● Provides information on energy production and supply on Federal lands. ● Assesses damage to energy-related infrastructure. ● Provides engineering and technical support as necessary. ● Develops and maintains information on critical energy-related infrastructure on Federal and tribal lands.
	Bureau of Reclamation ● Provides technical assistance for the assessment of hydroelectric facilities and flood control actions as they affect energy production. ● Uses Bureau of Reclamation personnel to assist in the repair of damaged hydropower generation facilities. ● Modifies operations at Bureau of Reclamation facilities to increase electrical generation to supplement losses in areas affected by an incident. ● Uses hydroelectric plant internal restart capabilities to assist in restoring the power system if blackouts occur.
	Minerals Management Service ● For Outer Continental Shelf (OCS) facilities, provides energy production and well reserve information. ● Assesses energy production damage and projected repair schedules for offshore facilities. ● Assists operators in minimizing the disruption of energy production by expediting review and approval of repair procedures for damaged facilities and/or in the prompt review and approval of proposals to resume production through the temporary rerouting of oil and gas production until permanent system(s) repair can be effected. ● Provides engineering and technical support as necessary.

	• Assists DHS/U.S. Coast Guard in the development of critical asset list of OCS oil and gas facilities. • Monitors and updates critical asset list of OCS oil and gas facilities.
Department of Labor	**Occupational Safety and Health Administration:** Implements processes identified in the Worker Safety and Health Support Annex to provide technical assistance during the restoration of the Nation's energy systems.
Department of State	• Coordinates with foreign nations and international organizations for assistance and information regarding energy supply and system damage. • Assists in implementation of emergency-related international energy agreements.
Department of Transportation (DOT)	**ESF #1:** DOT provides transportation infrastructure situational awareness and planning information to Federal, State, tribal, and local planners and response organizations.
	Pipeline and Hazardous Materials Safety Administration (PHMSA): PHMSA's Office of Pipeline Safety (OPS) is the Federal safety authority for the Nation's natural gas and hazardous liquid pipelines and liquefied natural gas facilities. OPS: • Ensures the safe, reliable, and environmentally sound operation of the Nation's pipeline transportation system. • Responds to requests for waivers of restrictions to meet emergency energy delivery requirements. • In coordination with DOE's Office of Electricity Delivery and Energy Reliability coordinates activities and shares information needed to ensure that the sectors of the energy infrastructure subject to each agency's jurisdiction or oversight can efficiently and effectively coordinate and integrate energy assurance activities. PHMSA's Office of Hazardous Materials Safety assists State, tribal, and local authorities with requests for special permits and approvals relating to the movement of hazardous materials in support of the Nation's energy demands.
	Maritime Administration (MARAD): Acts as the center for information on the location, capacity, and availability of U.S.-flag vessels suitable for the movement of energy supplies, including petroleum products and liquefied natural gas. Pursuant to a memorandum of agreement, coordinates with DOE and DHS/Customs and Border Protection on whether national defense considerations warrant waiver of the U.S. Cabotage law for the movement of energy supplies.

Environmental Protection Agency (EPA)	• Responds to requests from State and local officials for EPA to exercise enforcement discretion to waive environmental requirements for motor vehicle fuel in order to address supply shortages, normally in the context of natural disasters or significant disruptions in the fuel production or distribution systems. • Coordinates the collection of motor vehicle fuel supply information necessary to evaluate an enforcement discretion request. • Assists in identifying critical water and wastewater systems requiring priority power restoration.
Nuclear Regulatory Commission	• Regulates the Nation's civilian use of nuclear fuels and materials to include commercial nuclear power plants. • Provides information and technical assessment regarding nuclear power plants.
Tennessee Valley Authority	• Assesses supply, system damage, and repair requirements within the Tennessee Valley Authority. • Supplies surplus power as required to the power grid. • Supplies critical replacement parts and equipment as requested. • Supplies technical expertise as requested.

Appendix B: Energy Stakeholders

The following list represents the major stakeholders in the State of Maine's energy infrastructure and assurance. (Also see *Appendix V – "Directory of Energy Emergency Contacts and Resources"* for additional contact and resource information.)

Governmental Stakeholders

Federal Government

- U.S. Department of Energy
  - Office of Electricity Delivery and Energy Reliability
  - Infrastructure Security and Energy Restoration
- U. S. Energy Information Administration
- Federal Emergency Management Agency (FEMA)
- Federal Energy Regulatory Commission
- U.S. Department of Homeland Security
- U.S. Department of Health and Human Services

State of Maine

- Administrative and Financial Services – Bureau of General Services
- Department of Conservation
- Department of Environmental Protection
- Department of Transportation
- Governor's Energy Office
- Geographic Information Systems
- Emergency Management Agency
- State Housing Authority
  - Low Income Home Energy Assistance Program (LIHEAP)
  - Low Income Assistance Plan (LIAP)
  - Appliance Replacement Program
  - Weatherization Program & Central Heating Improvement Program
- Office of Attorney General
- Office of Public Advocate
- Maine Public Utilities Commission
- State Planning Office

Maine Community Action Agencies
Coalition of Northeastern Governors (CONEG)
National Association of Regulatory Utility Commissioners
National Association of State Energy Officers
North American Electric Reliability Corporation

Non-Governmental Stakeholders

American Council on Renewable Energy (ACORE)
Environmental Studies Institute (EESI)
National Resources Defense Council (NDRC)
Natural Resources Council of Maine (NRCM)

Energy Producers and Distributors

Bangor Hydro Electric Company
Central Maine Power
Citgo
ExxonMobile
Global Petroleum
Gulf Oil
Irving Oil
Maine Public Service Company
Maritimes & Northeast Pipeline (M&NE)
Portland Natural Gas Transmission System (PNGTS)
Sprague Energy
Webber Energy Fuels

Energy Associations and Coalitions

American Gas Association
American Petroleum Institute
ISO New England
Maine Energy Marketers Association
Maine Renewable Energy Association
Northeast Gas Association
Propane Gas Association of New England
The Industrial Energy Consumers Group

Consumer Stakeholders

518,200 Households, 1,318,301 Population (US Census Bureau: 2009 estimates)
35,776 Businesses (Source: 2007 County Business Patterns)

Appendix C: Electric Power Production in Maine

The following list represents a compilation of electric power producers in the State of Maine. Excluding wind, solar, hydro-electric, and geothermal.

FPL Energy Wyman LLC
William F Wyman
Cumberland, ME
846 MW

Calpine Eastern Corp
Westbrook Energy Center
Cumberland, ME
563.9 MW

Casco Bay Energy Co LLC
Maine Independence Station
Penobscot, ME
550.2 MW

International Paper Co- Bucksport
Hancock, ME
274.4 MW

Calpine Corp
Rumford Power Associates
Oxford, ME
262.9 MW

Calpine Androscoggin Energy
Androscoggin Energy Center
Franklin, ME
163.5 MW

Sappi Fine Paper North America
Somerset Plant
Somerset, ME
116.9 MW

Katahdin Paper Inc
Millinocket Mill
Penobscot, ME
110.7 MW

FPL Energy Mason LLC
Mason Steam
Lincoln, ME
106.5 MW

Rumford Cogeneration Co
Oxford, ME
102 MW

S D Warren Co
S D Warren Westbrook
Cumberland, ME
80.9 MW

IPC-Androscoggin Mill
Androscoggin Mill
Franklin, ME
80 MW

Domtar Industries Inc-
Domtar - Woodland Mill
Washington, ME
66.8 MW

Katahdin Paper Inc
East Millinocket Mill Biomass
Penobscot, ME
19.04 MW

Boralex Stratton Energy Inc
Biomass Facility
Franklin, ME
45.7 MW

Georgia-Pacific Corporation
Old Town Division
Penobscot, ME
44.5 MW

Boralex Ashland Inc
Boralex Ashland
Aroostook, ME
39.6 MW

Boralex Livermore Falls
Livermore Falls Biomass Facility
Androscoggin, ME
39.6 MW

Rumford Cogeneration Co
Rumford Falls Power
Oxford, ME
39.2 MW

Boralex Fort Fairfield Inc
Fort Fairfield Biomass Facility
Aroostook, ME
37.5 MW

FPL Energy Cape LLC
Cape Gas Turbine
Cumberland, ME
35 MW

Ridgewood Power Management LLC
Indeck Jonesboro Energy Center
Washington, ME
27.5 MW

Ridgewood Power Management LLC
Indeck West Enfield Energy Center
Penobscot, ME
27.5 MW

WPS New England Generation Inc
Caribou Generation Station
Aroostook, ME
27.4 MW

Morrill Worcester
Worcester Energy Biomass Facility
Washington, ME
25.8 MW

ESOCO Orrington Inc
Penobscot Energy Recover
Penobscot, ME
25.3 MW

Maine Energy Recovery Co
York, ME
22 MW

Wheelabrator Environmental Sys.
Sherman Biomass
Penobscot, ME
21 MW

Beaver Wood Joint Venture
Penobscot, ME
16.9 MW

Greenville Steam Co
Biomass Facility
Piscataquis, ME
16.1 MW

Regional Waste Systems
Cumberland, ME
13.3 MW

MeadWestvaco Corp
Mead Rumford Cogen
Oxford, ME
12.5 MW

Lincoln Paper and Tissue LLC
Penobscot, ME
6.5 MW

WPS New England Generation Inc
Flos Inn Diesel
Aroostook, ME
6 MW

Mid-Maine Waste Action Corp
MMWAC Resource Recovery Facility
Androscoggin, ME
5MW

Arcadia Energy II LLC
Benton Falls Associates
Kennebec, ME
4.2 MW

Robbins Lumber Inc
Robbins Lumber
Waldo, ME
3.2 MW

Lavalley Lumber LLC
York, ME
2.7 MW
J and L Electric
Franklin, ME
2 MW

Lewiston City of
Upper Androscoggin
Androscoggin, ME
1.6 MW

Aroostook and Bangor Resources
Aroostook and Bangor
Penobscot, ME
1.3 MW

Forster Strong Mill Biomass
Franklin, ME
0.85 MW

S D Warren Co
Somerset Biomass Facility
Cumberland, ME
26.88 MW

Indeck West Enfield Energy Center
Biomass Facility
Penobscot, ME
25.6 MW

Indeck Jonesboro Biomass
Indeck Jonesboro Energy Center
Washington, ME
26.8 MW

Somerset Plant
Biomass Facility
Somerset, ME
38.13 MW

Appendix D: Biomass Power Plants in Maine

The following list represents a compilation of the largest Biomass electric power producers in the State of Maine.

Biomass Facilities

East Millinocket Mill	19.04MW	Online-1954
Somerset Plant	34.23MW	Online-1976
Forster Strong Mill	00.35MW	Online-1980
S D Warren Somerset	26.88MW	Online-1982
Wheelabrator Sherman Energy Facility	21.00MW	Online-1986
Boralex Fort Fairfield	31.00MW	Online-1987
Indeck West Enfield Energy Center	25.60MW	Online-1987
Indeck Jonesboro Energy Center	26.80MW	Online-1987
Greenville Steam	16.10MW	Online-1988
Boralex Stratton Energy	45.70MW	Online-1989
Worcester Energy	13.00MW	Online-1989
Somerset Plant	42.63MW	Online-1990
Boralex Beaver Livermore Falls	34.70MW	Online-1992
Forster Strong Mill	00.50MW	Online-2004
Worcester Energy	24.56MW	Online-2005

Brief Profiles of Selected Biomass Facilities

Ashland, ME
Operator: Boralex
Output: 39.6 MW
Operation: 1993
Fuel: wood
Boiler Supplier: Zurn
T/G Supplier: GE
EPC: NEPCO
Quick Facts: About 1,350 tpd of wood waste is burned at Ashland using a two-drum boiler with a traveling grate stoker, a combination particulate control system, and a hog fuel handling system with covered storage. The plant was built in 18 months for original project developer Alternative Energy Inc.

Greenville, ME
Operator: New Energy Capital Corp
Output: 16 MW
Operation: 1985
Fuel: wood
Boiler Supplier: EPI
T/G Supplier: Unknown

EPC: Stone & Webster, Pizzagalli Construction
Quick Facts: The plant was acquired from Hafslund ASA in Sep 2005. Originally, the plant burned sawmill residues and waste wood in a B&W vibrating stoker boiler. More recently, carpet remnants were added to the fuel mix. The plant was refit for wood-firing only with a BFB boiler from EPI and new back-end emissions control equipment from Mobotec. This and other upgrades completed for $6.9mn will qualify the facility as a New Renewable Generating Unit under Massachusetts regulations, making it eligible to sell Renewable Energy Certificates (RECs) to load-serving entities in the New England market.

Jonesboro, ME
Operator: Covanta Energy Corp
Output: 24.5 MW
Operation: 1987
Fuel: wood
Boiler Supplier: B&W
T/G Supplier: MHI
EPC: Ultrasystems Engineers & Constructors, B&W
Quick Facts: Jonesboro began commercial operation in Nov 1987, one of two sister plants developed by Babcock-Ultrapower Joint Venture for electricity sales to Bangor Hydro-Electric Company. The JV consisted of Babcock & Wilcox (50%), ESI Energy, Inc (33%), and LG&E Power, Inc (17%). The plants were later sold and then acquired by Covanta in 2008 from co-owners Ridgewood Maine LLC and Indeck Energy Services. Fuel for the CFB boiler includes wood chips, bark, tree limbs and tops, mill residue and other clean forest-related biomass. Electricity is sold into the merchant power markets of ISO New England and also qualifies for Massachusetts Class I renewable energy certificates. Fuel burn is about 550 tpd.

Livermore Falls, ME
Location: 267 Diamond Road Livermore Falls, ME
Coordinates: 44.431756 -70.162032
Operator: Boralex
Output: 39.6 MW
Operation: 1992
Fuel: wood
Boiler Supplier: Zurn
T/G Supplier: GE
EPC: NEPCO
Quick Facts: The second of two nearly identical wood waste plants built in Maine for project developer Alternative Energy Inc.

Rumford Cogen, Maine
Operator: MeadWestvaco
Output: 102 MW
Operation: 1990
Fuel: wood, coal
Boiler Supplier: Pyropower
T/G Supplier: ABB
EPC: Bechtel
Quick Facts: This fluidized-bed project is at the Oxford Pulp and Paper Mill. Javelin Energy LLC, a partnership among Arclight Capital Partners, Delta Power and John

Hancock Financial Services, acquired a 10% interest in Rumford from Columbia Electric Corp in Dec 2000.

Sherman, ME
Location: Stacyville, ME
Operator: Wheelabrator Technologies
Output: 17.5 MW
Operation: 1986
Fuel: wood
Boiler Supplier: Zurn
T/G Supplier: Dresser
EPC: NEPCO
Quick Facts: About 770 tpd of wood waste is burned at Sherman using a boiler with a traveling grate stoker, an ESP, and dry cooling with zero wastewater discharge.

West Enfield, ME
Location: 1231 Main Road, West Enfield, ME
Coordinates: 45.253837 -68.628042
Operator: Covanta Energy Corp
Output: 24.5 MW
Operation: 1987
Fuel: wood
Boiler Supplier: B&W
T/G Supplier: MHI
EPC: Ultrasystems Engineers & Constructors, B&W
Quick Facts: West Enfield began commercial operation in Nov 1987 and is a sister plant to Jonesboro. Both were acquired by Covanta in 2008 from co-owners Ridgewood Maine LLC and Indeck Energy Services for $52mn. Fuel for the CFB boiler includes wood chips, bark, tree limbs and tops, mill residue and other clean forest-related biomass. Electricity is sold into the merchant power markets of ISO New England. Fuel burn is about 550 tpd. The stack is 136ft tall

Appendix E: Maine Tidal Energy Projects

The following material represents a compilation of the tidal energy projects in the State of Maine.

Maine Tidal Energy Industry Partners

- Ocean Renewable Power Company/ORPC Maine - OCGen™ technology & projects
- University of Maine Orono – Technology R&D, engineering & environmental studies
- Maine Maritime Academy – Technology R&D & engineering/operations oversight
- US Windblade – ADCF turbine design & manufacturing (composite materials)
- Harbor Technologies – TGU frame design & manufacturing (composite materials)
- Maine Marine Technology Center – Facilities for fabrication, assembly & shop testing
- Eastport Port Authority – Operations planning & marine services
- Devine Tarbell & Associates – FERC licensing & environmental permits
- Pierce Atwood – Legal counsel

Maine Has What It Takes For Successful Tidal Energy Development

- Tidal energy resources that are as robust as any in the U.S. and recognized worldwide
- Resources are close to shore and in reasonable proximity to transmission interconnection points
- Underutilized port facilities and marine equipment
- History of boatbuilding and marine services – workforce experienced in working on the water, composite manufacturing, etc.
- Significant R&D capabilities through universities and other institutions
- Mandate to reduce (or eliminate) dependency on imported energy
- Strong need for economic sustainable development based on Maine competitive advantages

Projects in Operation

OCGen™ Turbine-Generator Unit (TGU) Demonstration Project

December 2007 marked the successful launch of the ORPC Maine “Energy Tide 1”, a 20 by 48 foot barge with an ORPC tidal turbine-generator unit (TGU) deployed 30 feet below for testing in the tidal currents of Western Passage, on the Maine/New Brunswick border off Eastport, Maine. The technical feasibility of the TGU - the core component of ORPC’s proprietary OCGen™ technology - was successfully proven in April 2008 and the results

independently verified by Maine Maritime Academy as independent observers. Since then, additional testing has brought continued success. Through its tidal development efforts, ORPC Maine has proven not only its TGU design but also the economic development benefits of tidal energy.

Proposed Tidal Projects

Castine Harbor & Bagaduce Narrows Tidal Project

The Tidal Energy Device Evaluation Center (TEDEC) is a collaborative effort between Maine Maritime Academy (MMA) and three industry partners. Together they are developing a tidal energy project in Castine harbor and the Bagaduce River. This area has a great potential as a renewable energy source due to the high tidal range, strong currents, and narrow cross-section. Plans are under way to conduct an in-depth environmental study of the river and to engage the community in the planning process. Pending the results of the exploratory phase of the permitting process, the group intends the center to test a variety of tidal energy devices currently under development around the world. Center programs would focus on environmental and biological factors, design efficiencies, maintainability and reliability of tidal energy turbines. The proposed Center, the second of only two in the world and the first in the United States, would also provide educational and research opportunities for MMA students and faculty. If the project stays on schedule, the Center would also generate electricity in 2010. The proposed facility would put the school at the forefront of tidal energy research.

Grand Manan Channel Tidal Power Project

In 2008, Mananook Associates filed an application, pursuant to section 4(f) of the Federal Power Act, proposing to study the feasibility of the Grand Manan Channel Project, located in the Grand Manan Channel in Washington County, Lubec, Maine. The project uses no dam or impoundment. The proposed project would consist of: (1) 1,377 proposed tidal current generating units, with a total installed capacity of 72 megawatts, (2) a proposed transmission line, and (3) appurtenant facilities. The project is estimated to have an annual generation of 158gigawatthours, which would be sold to a local utility.

Half-Moon Cove Tidal Project

Tidewater Associates, a Trenton, Maine, engineering company has filed applications for a tidal power projects at Half Moon Cove involving a dam. The Half-Moon Cove Tidal Power Project, to be located off Quoddy Village, involves construction of a dam that would extend 1,210 feet across the inlet, with a maximum height of 67 feet. A powerhouse with three turbines, a transmission line and "appurtenant facilities" is planned. Capacity is estimated at 13.5 megawatts. Tidewater is also exploring the possibility of adding hydrokinetic component to the project. Once the feasibility has been determined the licensing process

will be undertaken. The preliminary permit is for three years and it is now projected that by 2010 work on the construction of a Tidal power facility can begin.

Maine 1 Project

Hydro Green Energy, LLC is a Texas-based renewable energy systems developer and integrator operating in the waterpower industry. Hydro Green Energy's hydrokinetic power systems generate electricity exclusively from moving water (river currents, tidal currents and ocean currents) without having to first construct dams, impoundments or conduits. The company has been issued a preliminary permit to explore the feasibility of locating one of its horizontal-axis hydrokinetic generation plants on Lubec Narrows in the Passamaquoddy Bay. This project would use no dam or impoundment.

OCGen™ Tidal Energy Projects

ORPC plans to build, own and operate a major OCGen™ tidal energy project at the Western Passage and Cobscook Bay sites. The ultimate tidal energy project will be developed and implemented in phases, starting with the currently operational turbine-generator unit (TGU) demonstration project. Following the TGU demonstration project, ORPC plans to engineer, build, install and monitor (for a minimum period of 1 year) a commercial scale prototype tidal OCGen™ module at one of the sites. ORPC hopes to install the prototype OCGen™ module in mid-2009 and operate it until at least mid-2010. ORPC then plans to begin installation of the 1st phase of the ultimate tidal energy project in mid-2011. The power generated will be interconnected to the New England electricity grid through the substation in Eastport.

Penobscot Tidal Energy Project

Maine Tidal Energy received a preliminary permit in May 2007 for the Penobscot Tidal Energy Hydroelectric Project. The project would consist of 100 tidal in-stream energy conversion devices (TISEC) consisting of rotating propeller blades and integrated generators with a capacity of 0.5 to 2.0 MW, anchoring systems, mooring lines and interconnection transmission lines. The project is estimated to have an annual generation of 8.76 gigawatt hours per unit per year which would be sold to a local utility.

Western Passage & Cobscook Bay Tidal Project

The Passamaquoddy Tribe is currently involved in assessing the possibilities for energy production through wind power and tidal power. The Tribe is assessing the viability of generating commercial electricity through wind power on their lands in Township19. While the site has a 130-megawatt capacity, development will be limited to 25 turbines, and when in operation, would provide power to run the Tribe's sewage treatment plant and generate excess electricity to be recycled. The Tribe has submitted an application to FERC to locate tidal power structures at two sites in the region. One is located just off the reservation, near First Island, and the second site is just north of Kendall Head in Western

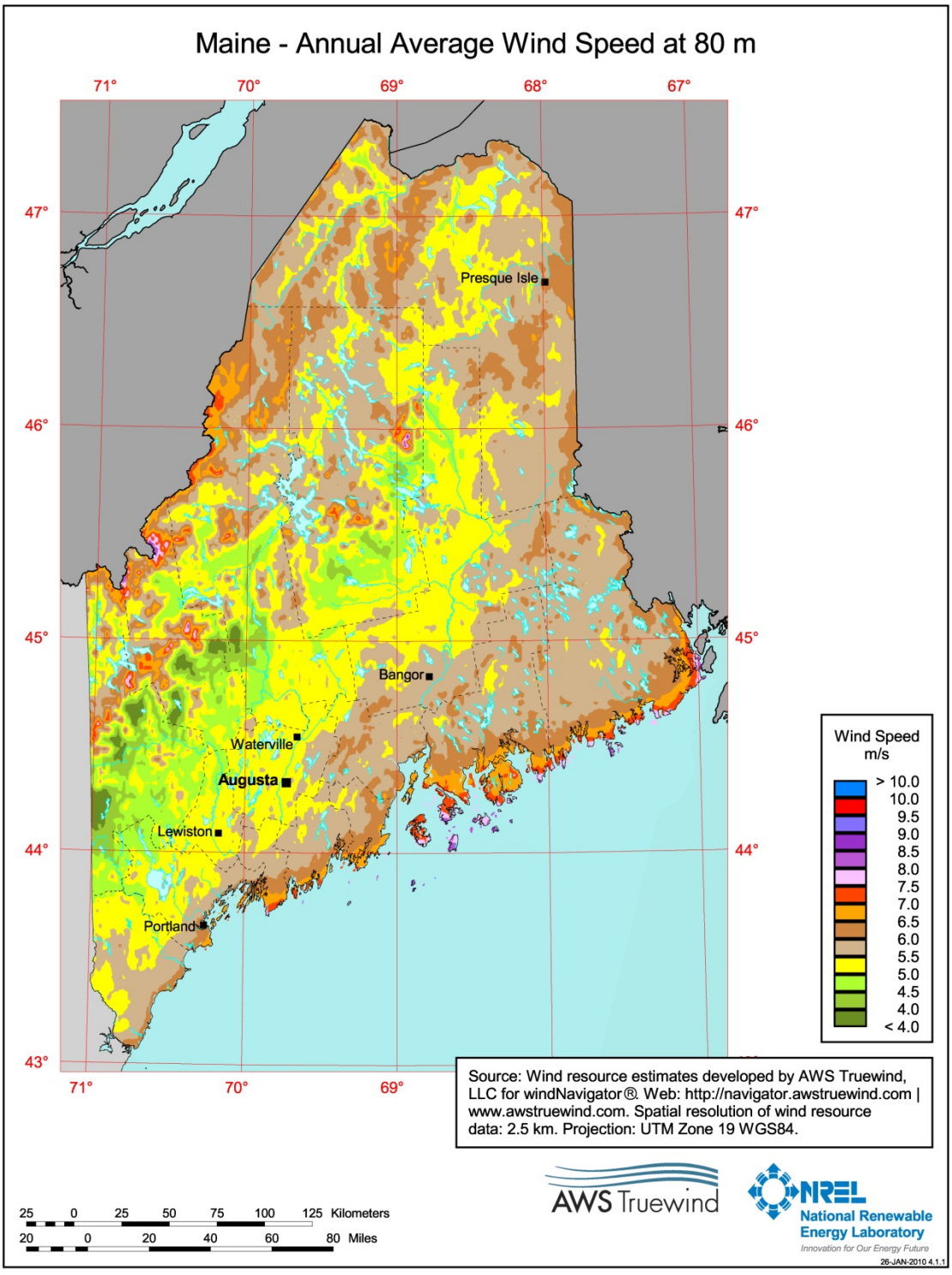
Passage. The Tribe is working with UEK Corporation to develop their tidal power project. The technology that the Tribe is considering using only weighs 30 pounds under water.

Town of Wiscasset Tidal Resources Project

The Town of Wiscasset, Maine, has been given preliminary approval to proceed with studies of the feasibility of the Tidal Resources Project to be located on the Sheepscot River in Lincoln County, Maine. This project arises out of a partnership between the town and a local conservation group, the Chewonki Foundation. The project would harness the rise and fall of tidal waters through turbines in the Sheepscot River for distribution to the local power grid. The project uses no dam or impoundment.

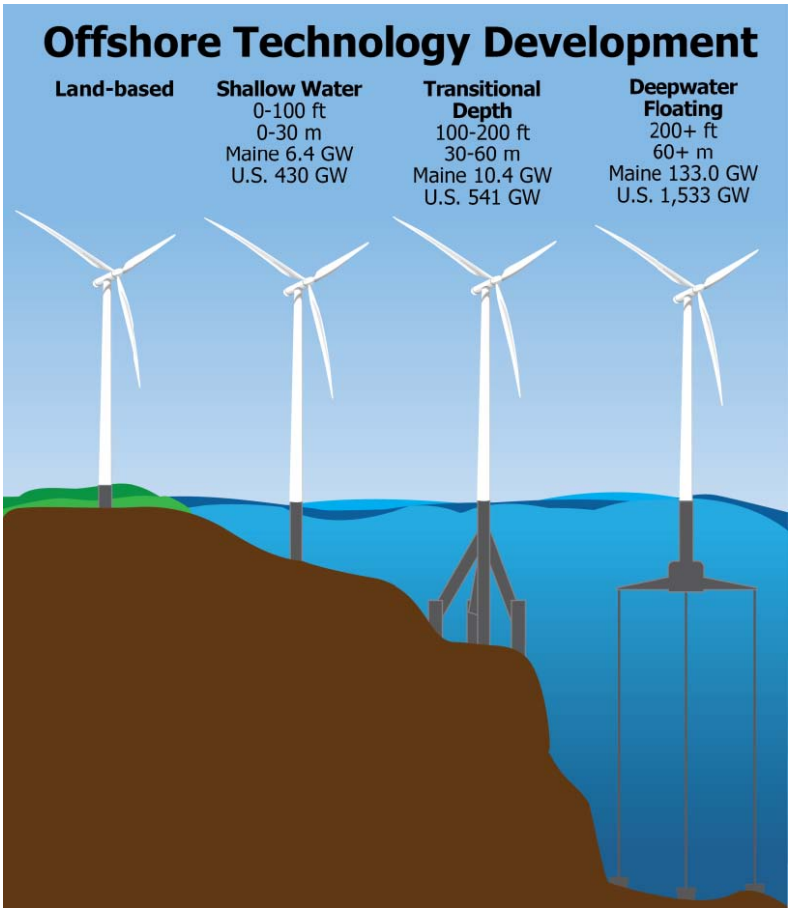
The proposed project would consist of: 4 to 40 OCGen(TM) hydrokinetic turbine generating units, with a total installed capacity of 1 to 10 megawatts; a proposed underwater transmission cable approximately 6 miles in length; a proposed 1,000-foot-long, 480-volt transmission line; and appurtenant facilities. The project is estimated to have an annual generation of 43.8 gigawatt-hours, which would be sold to a local utility.

Appendix F: Maine Wind Generation Projects



Maine Wind Energy Goals

In addition to the above Maine Renewables Portfolio Standard, there are three goals for wind-energy development in Maine: (1) at least 2,000 MW of installed capacity by 2015; (2) at least *3,000 M* facilities located in coastal waters or offshore; and (3) At least 8,000 MW of installed capacity by 2030, of which 5,000 MW should be from facilities in coastal waters or offshore. The first two goals were established in April 2008 (L.D. 2283), and the third was established in April 2010 (L.D. 1810). The Maine PUC issued a request for proposals in September 2010 for long-term contracts to supply capacity, energy and RECs from offshore wind energy projects (pilot) or tidal energy projects (demonstration), as directed by L.D. 1810.



Industrial Wind Energy Projects in Maine

Beaver Ridge Wind Project
Location: Freedom, Waldo County, ME (44.5302, -69.2977)
Developer: Patriot Renewables, LLC
Size: 4.5 MW
Technology: 3 (General Electric 1.5 MW SLE Wind Turbines)
Generation: 12.5 million kilowatt hours of electric generation per year
Equivalent number of homes supplied per year: 2,000

Mars Hill Wind Project
Location: Mars Hill, ME (46.5161, -67.8667)
Developer: First Wind
NRCM position: Supports this project
Size: 42 MW
Number of turbines: 28 (1.5 MW turbines)
Equivalent number of homes supplied: 24-25,000

Stetson Ridge Wind Project
Location: Stetson Ridge, Washington County, ME (44.9849, -67.6776)
Developer: First Wind (formerly known as UPC Wind Management, LLC)
Owner/Operator: Evergreen Wind Power
NRCM position: Supports this project
Size: 57 MW
Generation: 169,269,000 kilowatt hours of electric generation per year
Number of turbines: 38 (1.5 MW turbines)
Equivalent number of homes supplied per year: 23,500

Stetson II Wind Project
Location: Jimmey and Owl Mountains, Washington County, ME (44.9849, -67.6776)
Developer: First Wind
NRCM position: Supports this project
Size: 25.5 MW
Number of turbines: 17 (1.5 MW turbines)
Generation: 81,468,000 kilowatt hours of electric generation per year
Equivalent number of homes supplied per year: 11,407

Kibby Mountain Wind Project
Location: Kibby and Skinner Townships, Franklin County, ME (44.9673, -70.7622)
Developer: TransCanada
NRCM position: Supports this project
Size: 132 MW
Number of turbines: 44 (3 MW turbines)
Generation: 357 million kilowatt hours of electric generation per year

Equivalent number of homes supplied per year: 50,000 (or all the households in Franklin, Oxford, and Somerset Counties)

Vinalhaven Wind Project
Location: Vinalhaven, Knox County, ME (44.0929, -68.8667)
Developer: Fox Islands Wind, LLC in partnership with the Island Institute
Size: 4.5 MW
Number of turbines: 3 (1.5 MW turbines)
Generation: 11.6 million kilowatt hours of electric generation per year

Beaulieu Wind Project
Location: Madawaska, ME (46.8842, -67.9472)
Size: 50 KW
Technology: 1 (Atlantic Orient @ 50 KW)

Presque Isle Wind Project
Location: Presque Isle, ME (46.6706, -68.0190)
Developer: Lumus Construction
Owner/Operator: University of Maine
Size: 600 KW
Technology: 1 (600 KW RRB PS-600 Turbine)

Kittery Landfill Wind Project
Location: Kittery, ME (43.0843, -70.7338)
Size: 50 KW
Technology: 1 (Entegrity 50 KW Turbine)

Saco Train Wind Project
Location: Saco, ME (43.4955, -70.4480)
Developer: Entegrity Wind Systems
Owner/Operator: Saco Train Station
Size: 50 KW
Technology: 1 (50 KW Entegrity Wind Systems)

Rollins Wind Project
Location: Lincoln, Lee, Winn, Burlington, and Mattawamkeag, ME (45.6596, -67.8615)
Developer: First Wind
Project status: Permit approved by DEP
NRCM position: Supports this project
Size: 60 MW
Number of turbines: 40 (1.5 MW turbines)
Generation: 168 million kilowatt hours of electric generation per year
Equivalent number of homes supplied per year: 23,608

Spruce Mountain Wind Project
Location: Spruce Mountain, Woodstock, Oxford County (44.3824, -70.6430)

Developer: Patriot Renewables
Project status: Permit approved by DEP October, 2010
Size: 20 MW
Number of turbines: 10 (2 MW turbines)
Generation: more than 55 million kilowatt hours of electric generation per year
Equivalent number of homes supplied per year: up to 8,700

Wind Projects In Development

Bingham Wind Project
Location: Blanchard and Mayfield Townships
Developer: First Wind
Project status: Somerset County commissioners voted against a TIF agreement that would have applied to the 32 turbines slated for Mayfield Township, marking the first time a TIF for a wind power project has been rejected in the state. First Wind still plans to move ahead with the project.
Size: 49.7 MW
Number of turbines: 22

Fletcher Mountain Wind Project
Location: Lexington Township, Somerset County
Developer: Iberdrola
Project status: This project is in the early stage of development. The developer is still collecting wind data, conducting environmental studies, and/or preparing other documents for a potential permit application
Size: 60-80 MW
Number of turbines: 26

Kibby Expansion Wind Project
Location: Sisk Mountain, Franklin County, ME (45.3730, -70.6581)
Developer: TransCanada
Project status: Permit application submitted to LURC in December, 2009. In August 2010, LURC voted to allow TransCanada to submit a revised proposal
NRCM position: In the original proposal NRCM supported 8 turbines (24 MW) and opposed 7 turbines (21 MW). NRCM conducted a site visit in August, 2009. Revised proposal will be reviewed once submitted.
Size: 45 MW
Number of turbines: 15 (3 MW turbines)
Generation: 120 million kilowatt hours of electric generation per year
Equivalent number of homes supplied per year: approximately 17,000 average Maine households

Number Nine Wind Project
Location: Aroostook County, ME (46.4702, -68.3538)
Developer: Horizon Wind Energy
Size: 350 MW

Oakfield Wind Project
Location: Oakfield, ME (46.1009, -68.1587)
Developer: First Wind
Project status: Permit approved by DEP January, 2010 - under appeal
Size: 51 MW
Number of turbines: 34 (1.5 MW turbines)
Generation: 135 million kilowatt hours of electric generation per year
Equivalent number of homes supplied per year: more than 20,000

Rollins Wind Project
Location: Lincoln, Lee, Winn, Burlington, and Mattawamkeag, ME (45.6596, -67.8615)
Developer: First Wind
Project status: Permit approved by DEP
NRCM position: Supports this project
Size: 60 MW
Number of turbines: 40 (1.5 MW turbines)
Generation: 168 million kilowatt hours of electric generation per year
Equivalent number of homes supplied per year: 23,608

Highland Wind Project
Location: Stewart-Bald Mountains and Briggs-Burnt Hill, ME (45.1027, -70.0811)
Developer: Independence Wind
Project status: Permit application submitted to LURC in December 2009. On April 7, 2010 the permit review was suspended.
NRCM position: In active review
Size: Approximately 130 MW
Number of turbines: 48
Generation: 360 million kilowatt hours of electric generation per year
Equivalent number of homes supplied per year: Approximately 48,300

Record Hill Wind Project
Location: Roxbury and Byron, Oxford County, ME (44.7243, -70.6420)
Developer: Independence Wind
Project status: Permit approved by DEP, under appeal
NRCM position: Supports this project
Size: 50.6 MW
Number of turbines: 22 (2.3 MW turbines)
Generation: 130 million kilowatt hours of electric generation per year
Equivalent number of homes supplied per year: roughly equal to the amount of all residential electrical consumption in Oxford County

Longfellow / Black Mountain Wind Project
Location: Rumford, ME (44.5551, -70.5517)
Developer: First Wind
Size: 40.0 MW
Number of turbines: 19 (12 turbines in Rumford and 7 turbines in Roxbury)

Spruce Mountain Wind Project
Location: Spruce Mountain, Woodstock, Oxford County (44.3824, -70.6430)
Developer: Patriot Renewables
Project status: Permit approved by DEP October, 2010
Size: 20 MW
Number of turbines: 10 (2 MW turbines)
Generation: more than 55 million kilowatt hours of electric generation per year
Equivalent number of homes supplied per year: up to 8,700

Saddleback Ridge Wind Project
Location: Saddleback Ridge, Carthage, Franklin County, ME (44.6241, -70.4734)
Developer: Patriot Renewables
Project status: Permit application submitted to DEP in October 2010.
Size: 33 MW
Number of turbines: 12 (2.75 MW turbines)
Generation: more than 99 million kilowatt hours of electric generation per year
Equivalent number of homes supplied per year: more than 16,000

Bowers Mountain / Passadumkeag Wind Project
Location: Bowers Mountain, Carroll Plantation, Penobscot County
(Petition to expand the expedited area is in Kossuth Township, Washington county)
Developer: First Wind
Project status: Rulemaking petition to expand the expedited permitting area was submitted to LURC in May, 2010. A development permit application is expected to be filed with LURC in the fall of 2010.
NRCM position: Under review
Size: 69.1 MW
Number of turbines: 27 (2.3 / 3.0 MW turbines)

Bull Hill Wind Project
Location: Bull Hill and Heifer Hill ridges in T16 MD, Hancock County
Developer: First Wind
Project status: On January 31, 2011 the Commission has received a Development Permit Application from Blue Sky East, L.L.C., an affiliate of First Wind of Boston, MA
Size: 34.2 MW
Number of turbines:19

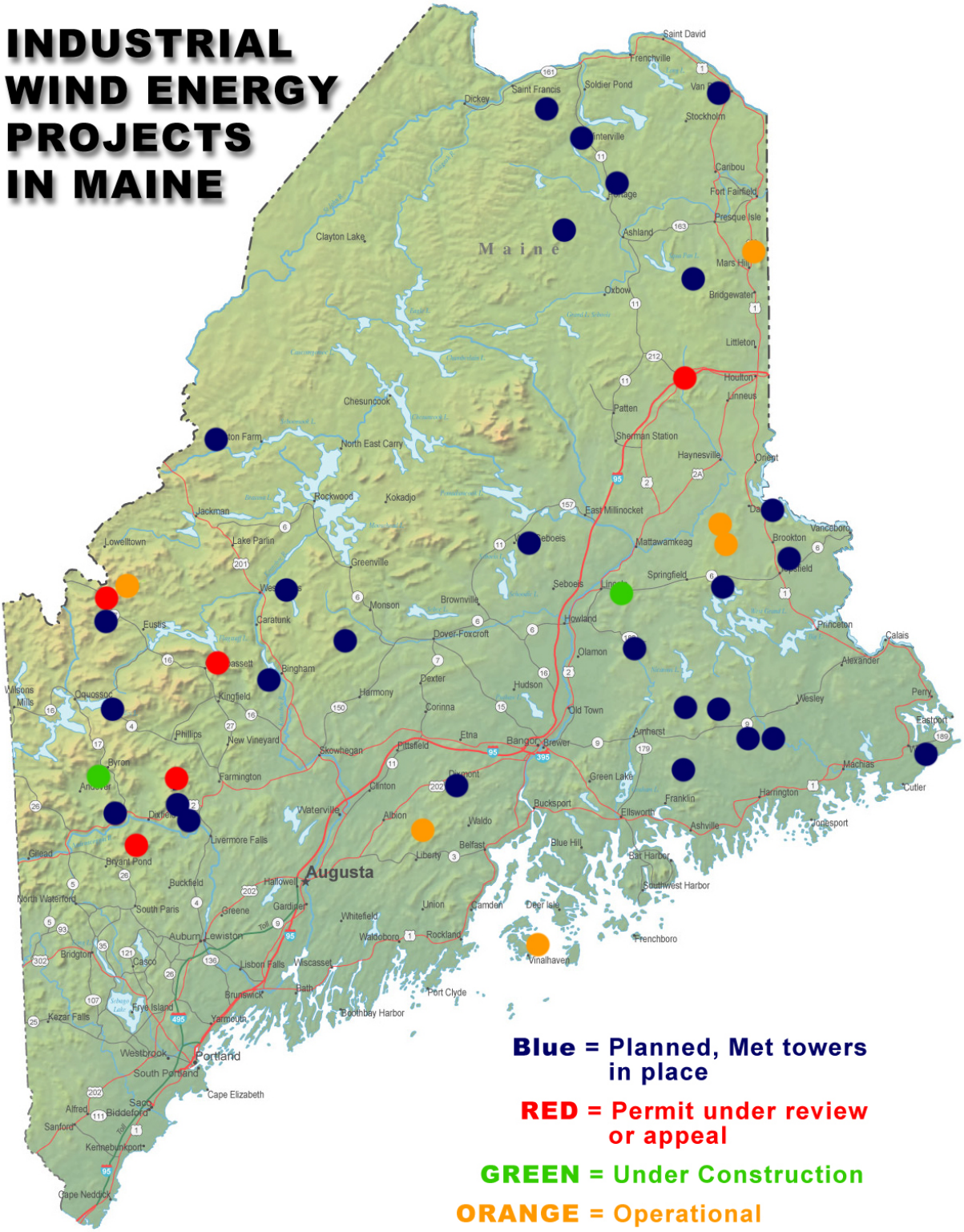
Mount Harris Wind Project
Location: Dixmont, ME (44.6846, -69.1388)
Owner/Operator: Competitive Energy Service
Size: 15000 KW

Port Service Authority Wind Project
Location: Jackman, ME (45.6564, -70.2461)
Developer: Alteris Renewables

Size: 200 KW
Technology: 2 (Northern Power Systems Northwind 100 KW Turbines)

Timber Wind Project (Dixfield)
Location: Dixfield, ME (44.5673, -70.3165)
Developer: Patriot Renewables
Size: 33 MW
Number of turbines:13

Timber Wind Project (Canton)
Location: Canton, ME (44.5081, -70.3165)
Developer: Patriot Renewables
Size: 22MW
Number of turbines: 8


INDUSTRIAL WIND ENERGY PROJECTS IN MAINE
Maine
Augusta
Portland
Blue = Planned, Met towers in place
RED = Permit under review or appeal
GREEN = Under Construction
ORANGE = Operational

Appendix G: Hydro-Electric Power Generation in Maine

The following list represents a compilation of the largest hydro-electric power producers (based on Megawatts generated) in the State of Maine.

Great Lakes Hydro America LLC
Penobscot, ME
135.7 MW

FPL Energy Maine Hydro LLC
Harris
Somerset, ME
76.4 MW

FPL Energy Maine Hydro LLC
Wyman Hydro
Somerset, ME
72 MW

Madison Paper Industries Inc
Anson Abenaki Hydros
Somerset, ME
29 MW

FPL Energy Maine Hydro LLC
Charles E Monty
Androscoggin, ME
28.4 MW

FPL Energy Maine Hydro LLC
Brunswick
Cumberland, ME
19.6 MW

Miller Hydro Group Inc
Worumbo Hydro Station
Androscoggin, ME
19.4 MW

UAH-Hydro Kennebec Ltd Partner
Hydro Kennebec Project
Kennebec, ME
15 MW

FPL Energy Maine Hydro LLC
Gulf Island
Androscoggin, ME
19.2 MW

FPL Energy Maine Hydro LLC
Skelton
York, ME
16.8 MW

Topsham Hydro Partners
Pejepscot Hydroelectric Project
Sagadahoc, ME
13.7 MW

Bangor Pacific Operating Co
Bangor Pacific Hydro
Penobscot, ME
13 MW

FPL Energy Maine Hydro LLC
Williams
Somerset, ME
13 MW

FPL Energy Maine Hydro LLC
Weston
Somerset, ME
12 MW

FPL Energy Maine Hydro LLC
Hiram
Cumberland, ME
10.5 MW

International Paper Co
Otis Hydro
Franklin, ME
10.2 MW

International Paper Co
Livermore Hydro
Andrscoggin, ME
9.2 MW

PPL Maine LLC
PPL Ellsworth Hydro Station
Hancock, ME
8.9 MW

FPL Energy Maine Hydro LLC
Shawmut
Somerset, ME
8.8 MW

PPL Maine LLC
PPL Veazie Hydro Station
Penobscot, ME
8.1 MW

Bangor Hydro-Electric Co
Bar Harbor
Hancock, ME
8 MW

Bangor Hydro-Electric Co
Medway
Penobscot, ME
8 MW

FPL Energy Maine Hydro LLC
West Buxton
York, ME
7.7 MW

PPL Maine LLC
Great Works Hydro
Penobscot, ME
7.7 MW

FPL Energy Maine Hydro LLC
Bonny Eagle
York, ME
7.2 MW

Merimil Ltd Partnership
Lockwood Hydroelectric Facility
Kennebec, ME
7.2 MW

FPL Energy Maine Hydro LLC
Aziscohos Hydroelectric Project
Oxford, ME
6.7 MW

FPL Energy Maine Hydro LLC
Cataract
York, ME
6.6 MW

International Paper Co
International Paper Riley Hydro
Franklin, ME
6.6 MW

FPL Energy Maine Hydro LLC
Deer Rips
Androscoggin, ME
6.5 MW

PPL Maine LLC
PPL Milford Hydro Station
Penobscot, ME
6.4 MW

Bangor Hydro-Electric Co
Eastport
Washington, ME
4 MW

FPL Energy Maine Hydro LLC
Bar Mills
York, ME
4 MW

FPL Energy Maine Hydro LLC
Bates Mill Upper
Androscoggin, ME
3.9 MW

Brassua Hydroelectric LP
Brassua Hydroelectric Project
Somerset, ME
3.6 MW

FPL Energy Maine Hydro LLC
Androscoggin 3
Androscoggin, ME
3.6 MW

PPL Maine LLC
PPL Medway Hydro
Penobscot, ME
3.2 MW

International Paper Co
Jay Hydro
Franklin, ME
3.1 MW

FPL Energy Maine Hydro LLC
North Gorham
Cumberland, ME
2.2 MW

FPL Energy Maine Hydro LLC
Hill Mill
Androscoggin, ME
1.8 MW

PPL Maine LLC
PPL Howland Hydro Station
Penobscot, ME
1.8 MW

PPL Maine LLC
PPL Stillwater Hydro Station
Penobscot, ME
1.8 MW

Ridgewood Maine Hydo Partnership LP
Pittsfield
Waldo, ME
1.7 MW

Ridgewood Maine Hydo Partnership LP
Barker Lower
Androscoggin, ME
1.6 MW

Ridgewood Maine Hydo Partnership LP
Pumpkin Hill
Kennebec, ME
1.5 MW

Ridgewood Maine Hydo Partnership LP
Barker Mill Upper
Androscoggin, ME
1.5 MW

WPS New England Generation Inc
Squa Pan Hydro Station
Aroostook, ME
1.5 MW

FPL Energy Maine Hydro LLC
Continental Mills
Androscoggin, ME
1.4 MW

FPL Energy Maine Hydro LLC
Fort Halifax
Kennebec, ME
1.4 MW

Ridgewood Maine Hydo Partnership LP
Mechanic Falls
Androscoggin, ME
1.3 MW

Consolidated Hydro NH Inc
Salmon Falls
York ME
1.2 MW

Ridgewood Maine Hydo Partnership LP
Gardiner
Kennebec, ME
1.2

Maine Renewable LLC
Messalonskee 2 (Oakland)
Kennebec, ME
2.8 MW

Maine Renewable LLC
Messalonskee 5
Kennebec, ME
1.8 MW

Maine Renewable LLC
Messalonskee 3
Kennebec, ME
1.6 MW

Appendix H: Petroleum Demand Reduction Measures

DEMAND REDUCTION OPTIONS

This section sets forth specific demand-reduction actions that may be taken by the state to respond to petroleum fuel shortages. Various petroleum demand-reduction strategies, both voluntary and mandatory, are recommended depending on the severity of the shortage. These strategies may be necessary to minimize adverse impacts on public health, safety, mobility, and the state's economy. The legal authority for the mandatory reduction strategies are the broad emergency powers of the Governor of Maine, once a 'state of emergency' is proclaimed. The Plan will rely on energy markets, to the fullest, extent possible for responding to petroleum supply shortages. A petroleum price increase resulting from a nationwide decrease in fuel supply would reduce demand and help control the consumption of motor fuel.

THREE PHASES OF PETROLEUM DEMAND REDUCTION

Petroleum demand reduction measures may be divided into three phases of shortage in order to guide effective response measures. These phases are mild, moderate and severe petroleum shortages. These response measures are designed in accord with the severity of a shortage in order to reduce travel and fuel purchases gradually as severity increases.

PHASE I - MILD SHORTAGE (5%-10% SHORTFALL)

Some lines, small lines one to five automobiles long.
Measures:

1. Petroleum Demand Reduction Information and Dissemination
2. Speed Limit Enforcement

PHASE II - MODERATE SHORTAGE (10%-20% SHORTFALL)

Many lines, 5-10 automobiles long
Measures (the measures in Phase I plus the following):

1. Employer/School Plan
2. Drive-Up Windows Prohibition
3. Request Waiver of Federal Reid Vapor Pressure Fuel Requirements
4. Request Waiver for Sale of Off-road Diesel for On-road Use

PHASE III -SEVERE SHORTAGE (20% AND GREATER SHORTFALL)

Lines everywhere, ten plus automobiles in line
Measures (the measures in Phase I and II plus the following):

1. Minimum Fuel Purchase
2. Driverless Days
3. Lowering the Speed Limit

The analysis uses various assumptions based on existing knowledge about how travelers may respond under emergency conditions to develop estimates of potential fuel savings. Results suggest that the most restrictive policies, such as driving bans, mandatory carpooling, and speed limit reductions are the most effective. Other policies provide small reductions with some, such as telecommuting and flexible work schedules, having the potential to be easily implemented. Those policies, focused on encouraging public transport use, are less effective and potentially more costly to implement.

Some of these policies may be suitable for implementation during an oil supply crisis, and could offer consumers more flexibility than mandatory fuel rationing, and thus are likely to result in less economic hardship.

While not all policies are feasible to implement under emergency conditions, we have identified several that appear viable. Specifically, we examine various work-based policies (telecommuting, flexible work schedules), the potential of carpooling, speed limit reductions, driving bans and restrictions, increased public transport usage, and providing information on the effect of maintaining optimal tire pressures. Rail, marine, and air travel were not analyzed. A key difference in this analysis compared to analyses of these same policies under normal conditions is that these policies may have different types of impacts, and costs, under emergency conditions. They may also, in some cases, be more acceptable to the public under emergency conditions.

One issue to consider is that many travel demand restraint policies require a level of preplanning, particularly if the intent is to implement them on short notice.

The types of policies that are available to governments under crisis conditions may also be greater than under normal circumstances, especially if they are considered temporary. The travel demand literature, however, focuses on estimating effects under normal circumstances. For example, promoting carpooling under normal circumstances may achieve at best a modest effect, while under crisis conditions this could be more substantial. This would occur for two reasons. First, some individuals may no longer have access to fuel, face a long queue to obtain it, or would be financially constrained by price increases, and thus would actively seek out carpooling options. Secondly, altruistic behavior may be more likely during a real crisis.

Increasing public transport usage

We explored three main approaches for increasing public transport use on an emergency basis during a petroleum supply crisis. These are fare reductions or elimination, service frequency increases, and bus lane prioritization enhancements. Service increases can be represented as increasing frequencies, and thus decreasing traveler wait times. Modeling studies have empirically demonstrated waiting time reductions are more highly valued than reductions in in-vehicle travel time. Conceptually, these service increases could also be associated with higher passenger comfort (less crowding) and greater service reliability. One strategy could be to extend the operational hours of bus and HOV lanes to 24 hours and weekends. Often, these facilities function as bus and HOV facilities only a few hours per day, usually in the rush hour peak direction. Actual changes in modal split are highly dependent upon the travel time savings and reliability improvements that can be achieved by bus lanes. One benefit of bus lanes is that creating them on-street is relatively cheap, requiring only some road striping and signage. In addition, these can be set up relatively fast and could be prepared in advance in anticipation of potential fuel shortage emergencies.

Increasing Carpooling

Encouragement of carpooling is also another potential option for decreasing single-occupant vehicle travel. Carpooling refers to more than one individual sharing a ride in a car, often on a regular basis.2 Various policies for encouraging carpooling have been devised. These include the construction of carpool lanes, preferential parking, and methods for matching potential carpoolers (usually commuting to the same place of employment). Many cities in the United States have built carpool lanes (also known as High-Occupancy Vehicle or HOV lanes) on major motorways, either by simply restriping lanes or by major investment in dedicated facilities. Overall, most areas find that the amount of people carried in these lanes often exceeds those in mixed-flow lanes, although most HOV lanes are still underutilized. HOV lanes generally are found to be more effective when commute lengths are long (leading to greater travel

time savings) and when commutes are to centralized zones which allow access on foot to other activities. Most HOV users are shifted from public transport when HOV lanes are constructed. However, under emergency conditions, potential usage might be greater. As can be seen, the potential range of reduction in fuel use is quite large, and the relative effectiveness would clearly be linked to the ability of drivers to find carpooling partners, especially for commute trips.

Encouraging telecommuting or working at home

Telecommuting can be strictly defined as working at home but maintaining office contact via telecommunications. This could be either through the phone or computer. Essentially, this term is used for home-based office work. The total impacts of telecommuting on fuel consumption are difficult to clearly estimate. This is due to uncertainty in how telecommuters behave. For example, while they may avoid peak travel during congested conditions, it is unknown how much additional travel they may make from home during the day which they would not have otherwise made. Telecommuters may also tend to subsequently relocate to live further from their workplace than non-telecommuters. Induced travel effects may also eliminate the congestion reduction benefits of removing telecommuters from peak traffic flows. However, from a short term perspective under fuel shortage conditions, telecommuting can offer some fraction of the workforce the opportunity to continue to engage in economic activity without traveling to work.

Specific policies can be pursued to promote telecommuting, especially under emergency conditions. Persuading employers that telecommuting would not be harmful may be necessary. This can be done by educating employers about the potential costs and benefits. One possible policy mechanism is to sign up large employers to a telecommuting program that would be implemented under emergency conditions. Employers would agree to have certain employees telecommute at least part of the time during any fuel shortage emergency. In addition, in some cases it might be necessary to provide computer access at home, although many of those with jobs conducive to telecommuting may already have home computers and internet access.

Encouraging Compressed Work Schedules

Compressed work schedules allow employees to work a full-time work schedule in arrangements other than the conventional five days per week, 7-8 hours per day workday. Compressed schedules allow employees to work fewer days per week but longer days. A typical compressed work schedule is a 4/40 work week (working four 10-hour days per week with one weekday off every week). Some employers currently offer this option to employees who might prefer this type of schedule. During crisis conditions this type of policy could be relatively easy to implement and employer cooperation would likely be greater. Some commuters, however, may have inflexible schedules dictated by other activity commitments (e.g. child-tending) making it difficult for them to alter their schedules quickly.

Implementation of odd/even driving bans

Driving ban policies are likely to be effective (and more politically acceptable) in emergency conditions when people are aware of the need to conserve fuel. Their effectiveness will also depend upon the availability of other options (such as public transport 19 or carpooling opportunities), and thus any evaluation of the potential fuel savings needs to consider these elements. In addition, the prevalence of households with more than one vehicle will also have an impact on both the feasibility and effectiveness of these policies. For example, having more than one vehicle in a household will enable a household to engage in carpooling. However, it also may mean that some trips that would not have been possible with only one vehicle can still be taken. To some extent, this may make it more politically feasible to implement this sort of policy, although the effectiveness is reduced. This will clearly depend on where people live and work, and the feasibility of sharing rides to work. Some shared rides may also be longer if trips are made to drop someone off at a destination. This could represent people being driven to work or dropped off en-

route to another destination. Our assumption takes into consideration that while some trips may be shifted to other modes, other trips may actually be increased, such as a circuitous trip to drop a spouse off at work and pick them up in the evening. Results are shown in Table 3. This type of policy, while not achieving a 50% reduction in transport fuel, does achieve the largest reduction of any of the policies estimated. The downside of this type of policy, is that it restricts choice among drivers; all the other policies evaluated are designed to provide drivers with alternative options, rather than restricting choice. Not surprisingly, more restrictive policies are generally more effective.

Reducing vehicle speeds

Reductions in maximum speed limits can be an effective policy for obtaining short-term reductions in fuel consumption. A policy limiting speeds to a maximum of 55 mph was implemented in the US in the 1970's and was initially quite effective, although over time enforcement and compliance decreased.

Most estimates of fuel efficiency with respect to speeds are based upon average driving cycles, thereby incorporating some proportion of accelerations and a variety of different speeds into estimates. Using these factors, the best fuel efficiency is achieved at speeds between 30 and 60 mph, deteriorating at higher speeds (Oak Ridge National Laboratory, 2003). The lower efficiency numbers at lower speeds would tend to be biased by being based on driving conditions with more stop and go driving and more accelerations. However, these figures would provide a basis for estimating the effect of speed reductions on motorways to speed limits of 55 mph.

These policies can consist of many different measures. Experience in the US suggests that a good enforcement strategy is required. This can consist of increasing traffic police, increasing fines, and also introducing speed cameras. Effectiveness of reducing speeds and decreasing unnecessary accelerations might also be effective.

Optimal tire pressures

Maintaining the proper tire pressure can have a significant effect on total fuel consumption.

WAIVER OF DRIVER HOURS AND LOAD RESTRICTIONS MEASURES

Requests by the state to temporarily remove restrictions on truck driver hours and truck weight limits have proven effective in reducing the impact of energy emergencies. Requests for such waivers are made through the Department of Transportation (DOT). Temporarily waiving these restrictions are especially beneficial for improving local supplies of propane, petroleum, and coal by allowing quicker replenishment into and within the state.

PETROLEUM SUPPLY ENHANCEMENT STRATEGIES

Two additional measures that can lead to petroleum supply enhancement are requesting a waiver of the Reid Vapor Pressure (RVP) fuel requirements and a federal waiver allowing the temporary sale of dyed (non-taxed) off-road diesel for on-road use.

WAIVER OF REID VAPOR PRESSURE FUEL REQUIREMENTS MEASURE

In an effort to increase the availability of gasoline in the state, a temporary waiver of the federal RVP fuel requirements would be requested. Requests to the Environmental Protection Agency (EPA) would be coordinated with the Petroleum Council, the Governor's Office, the Attorney General's Office, and the Department of Environmental Management. The reason for the RVP fuel is that as gasoline evaporates volatile organic compounds (VOC's) enter the atmosphere and contribute to ozone formation.

Gasoline's propensity to evaporate is measured by RVP. Federal air quality regulations require the use of lower RVP fuels in some areas in order to control VOC emissions during the summer high-ozone season (established by EPA as June 1 to September 15). A temporary waiver of the RVP requirement allows petroleum suppliers to increase the bulk delivery of fuel to the state, by refining only one type of fuel for delivery.

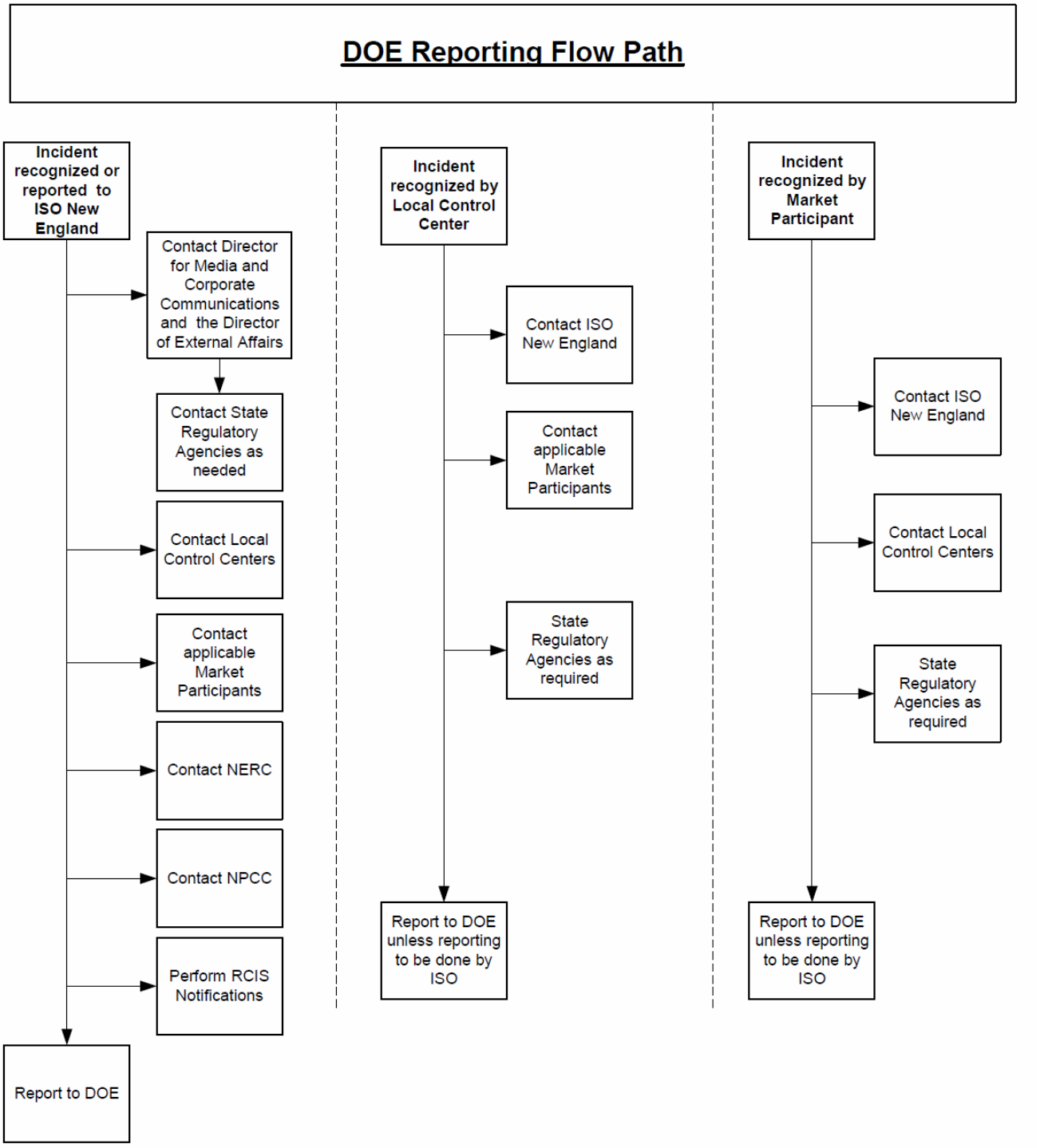
WAIVER TO ALLOW ON-ROAD USE OF OFF-ROAD DIESEL MEASURE

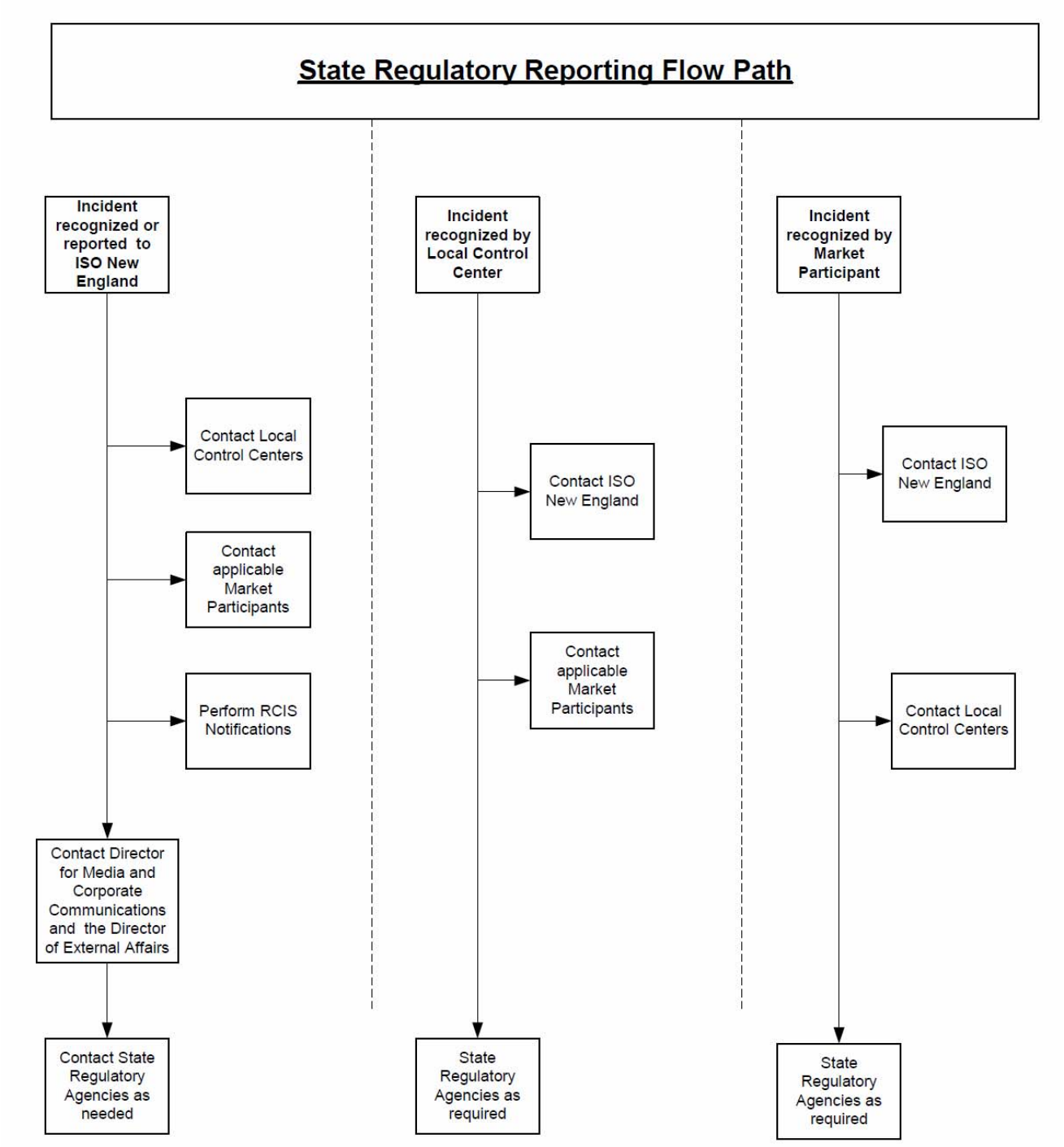
In an effort to increase the availability of gasoline in the state, a temporary federal waiver would be requested to allow the sale of the dyed diesel that is non-taxed for off-road use to supplement the availability of taxed on-road diesel. The request to the Internal Revenue Service (IRS) would be coordinated with the Petroleum Council, the Governor's Office, the Attorney General's Office, and the Department of Revenue. A temporary waiver allowing the sale of dyed off-road diesel for use on the road would immediately increase the availability of diesel for transportation fuels by allowing off road diesel, stored in the state by fuel providers, to be delivered immediately for sale for on-road use.

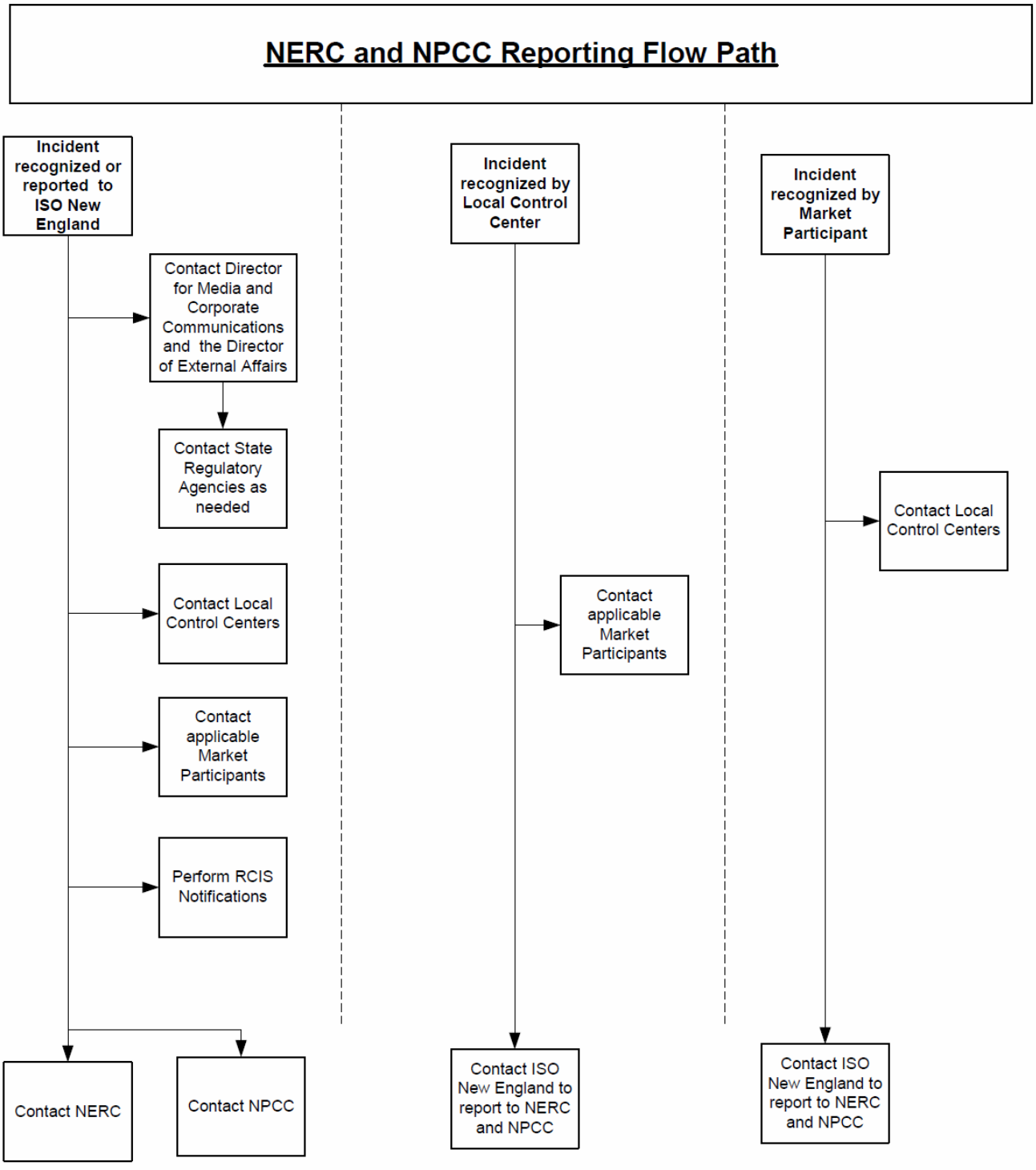
Conclusions

These estimates carry a range of uncertainty in terms of the absolute value of the reductions which may be achieved. However, the relative effects between policies appear reasonable. The policy strategies shown are to a large degree mutually exclusive of each other. We have not attempted to explore combinations of these measures. Clearly, a combined package of policies could increase the impacts compared to just one, but would not have an effect equal to the sum of these policies.

Appendix I: Energy Emergency Reporting Flow Paths




State Regulatory Reporting Flow Path
Incident recognized or reported to ISO New England
Contact Local Control Centers
Contact applicable Market Participants
Perform RCIS Notifications
Contact Director for Media and Corporate Communications and the Director of External Affairs
Contact State Regulatory Agencies as needed
Incident recognized by Local Control Center
Contact ISO New England
Contact applicable Market Participants
State Regulatory Agencies as required
Incident recognized by Market Participant
Contact ISO New England
Contact Local Control Centers
State Regulatory Agencies as required


NERC and NPCC Reporting Flow Path
Incident recognized or reported to ISO New England
Contact Director for Media and Corporate Communications and the Director of External Affairs
Contact State Regulatory Agencies as needed
Contact Local Control Centers
Contact applicable Market Participants
Perform RCIS Notifications
Contact NERC
Contact NPCC
Incident recognized by Local Control Center
Contact applicable Market Participants
Contact ISO New England to report to NERC and NPCC
Incident recognized by Market Participant
Contact Local Control Centers
Contact ISO New England to report to NERC and NPCC

Appendix J: ISO-New England Operating Procedure #4

Effective Date: December 10, 2010 - Revision No. 10

PART I – INTRODUCTION

This procedure establishes criteria and guides for actions during capacity deficiencies, as directed by ISO New England (ISO) and as implemented by ISO and the Local Control Centers (LCCs). This procedure may be implemented any time one or more of the following events, or other similar events, occur or are expected to occur:

- The resources available to the New England Reliability Coordinator Area/ Balancing Authority Area (RCA/BAA) outside of OP-4 are insufficient to meet the anticipated load plus Operating Reserve Requirements. It will not be utilized to maintain Replacement Reserve Requirements.
- One or more contingencies have occurred resulting in an immediate deficiency in the New England RCA/BAA available capacity resources required to meet the load plus Operating Reserve Requirements.
- Transmission facilities into a sub area of the New England RCA/BAA are loaded beyond established transfer capabilities.
- A sub area of the New England RCA/BAA is experiencing abnormal voltage and/or reactive conditions.
- The need to implement manual load shedding as required by ISO New England Operating Procedure No. 7 - Action In An Emergency (OP-7) is imminent but load shedding may be avoided, or reduced in magnitude, by application of this procedure.
- Another Northeast Power Coordinating Council (NPCC) RCA/BAA, or a remote system or pool, is experiencing a capacity deficiency and has requested assistance from ISO, which, if provided, will reduce the New England RCA/BAA actual Operating Reserve below the required levels.
- Any other serious threat to the integrity of the bulk power system for which ISO determines that this procedure will mitigate the impact.

Appendix A contains an estimate of the additional generation and load relief, which will be achieved through implementation of the Actions specified in this procedure.

PART II – PROCEDURE

I. IMPLEMENTATION BY ISO NEW ENGLAND

ISO will alert the LCCs and Market Participants promptly any time one or more of the above conditions are anticipated, or have actually been experienced, and application of this procedure may be required. ISO will also alert the surrounding RCAs/BAAs and coordinate with these RCAs/BAAs in accordance with NPCC Document A-06 - Operating Reserve Criteria A-06, and NPCC Document C-20 - Procedures During Abnormal Operating Conditions. The alert will be issued in accordance with Master/Local Control Center Procedure No. 2 - Abnormal Conditions Alert (M/LCC 2). Upon implementation, ISO will notify the LCCs of the Actions required by number. ISO and the LCCs will initiate Actions according to the authority and responsibility assigned by this procedure. To the extent possible, ISO will continue to dispatch resources in accordance with Market Rule 1, while ensuring reliability in the New England RCA/BAA during implementation of OP-4.

Action 1 and 2 will be implemented to the extent required to maintain Operating Reserve Requirements, in accordance with ISO New England Operating Procedure No. 8 - Operating Reserve and Regulation (OP-8) and/or to provide necessary dispatch options during abnormal conditions.

ACTION 1 (An ISO responsibility)

ISO will inform all resources that a capacity shortage exists. Each Generator and Demand Resource with a Capacity Supply Obligation will prepare to provide all associated Operable Capability.

ISO will notify via the “Notices” section of the ISO New England website that all “Settlement Only” Generators with real-time obligations and capacity supply obligations should be monitoring the status of the reserve pricing and are required to meet their obligations under the “Shortage Event” definitions in Market Rule 1.

Begin to allow the depletion of 30-minute reserve.

Implement a Power Caution.

ACTION 2 (An ISO responsibility)

Dispatch Real Time Demand Resources in the amount and location required.

ACTION 3 (ISO responsible for generation and demand designated entities, LCCs for office complexes.)

Request voluntary load curtailment of Market Participants’ facilities in the New England RCA/BAA.

ACTION 4 (An ISO responsibility)

Implement a Power Watch

The ISO will normally implement Action 5 and beyond of this procedure to maintain Ten-Minute Reserve.

ACTION 5 (An ISO responsibility)

Arrange to purchase available emergency capacity and energy, or energy only, (if capacity backing is not available) from Market Participants or neighboring RCAs/BAAs. Control Area to Control Area transactions will normally be used as a last resort, when market-based emergency energy transactions are not available, or not available in a timely fashion.

Action 6 may be implemented to the extent required to maintain 10-minute reserve, in accordance with OP-8, and to enable ISO to better cope with possible continuing and deteriorating abnormal operating conditions.

ACTION 6 (ISO responsible for Demand Resources and sharing reserves, LCCs for voltage reduction)

Implement a voltage reduction of five percent (5%) of normal operating voltage requiring more than 10 minutes to implement.

Dispatch Real-Time Emergency Generation Resources in the amount and location required.

Alert the New York Independent System Operator (NYISO) that sharing of reserves within NPCC may be required.

ACTION 7 (ISO responsibility)

NOTE: The following request will be made on a forecast basis when ISO anticipates it will be unable to maintain Ten Minute Reserves or in real-time based on the current operating day conditions

Request Generators not subject to a Capacity Supply Obligation (CSO) voluntarily provide energy for reliability purposes.

Action 8 will be implemented to maintain adequate 10-minute synchronized reserve in the New England RCA/BAA. The amount of 10-minute synchronized reserve to be maintained will be determined based on actual system conditions at the time of the shortage or the need to aid another NPCC RCA/BAA under the NPCC Operating Reserve Policy.

ACTION 8 (An ISO and LCC responsibility)

Implement a voltage reduction of five percent (5%) of normal operating voltage that is attainable within 10 minutes.

Actions 9, 10 and 11 will normally be implemented by the ISO through the LCCs based upon advance projections made by ISO that it will be necessary to implement Actions 1 through 8, and that it will not be possible to maintain adequate 10-minute synchronized reserve. When Actions 9 and 10 are requested, the particular hours that they are to be implemented will be specified by

ISO. Actions 9, 10, and 11 should be implemented as early as possible to achieve maximum benefit.

ACTION 9 (LCC responsibility)

Request all of the customer generation not contractually available to Market Participants. Request voluntary load curtailment by large industrial and commercial customers.

ACTION 10 (An ISO and LCC responsibility)

Initiate radio and television appeals for voluntary load curtailment.

Implement a Power Warning.

Depending on the circumstances and the time required to institute certain of the above Actions, it may be necessary to call for some Actions simultaneously, or to alter the order of initiations. When all of the above Actions have been taken, further action, if required, is covered under OP-7.

It may be necessary to implement OP-7, prior to the implementation of all of the above Actions. If, at any time during implementation of the above Actions, it appears that implementation of OP-7 will be required; ISO shall so notify all LCCs.

When Action 11 is requested, the particular hours that this Action is to be implemented will be specified by the ISO.

ACTION 11 (An ISO responsibility)

Request New England state Governors to reinforce Power Warning appeals, as initiated in Action 10.

II. CANCELLATION OF ACTIONS

When the system conditions have improved sufficiently, the ISO will cancel the Actions instituted in Section I. above. Depending on system conditions, the order of cancellation may be different from the order of initiation.

III. IMPLEMENTATION BY LCCS

Any of the Actions provided in this procedure may be implemented by an LCC to deal with local conditions within that LCC. The severity of the condition will determine the Actions taken. ISO will review LCC implementation of this procedure to ensure the implementation is consistent with Market Rule 1 and ISO Manuals.

IV. COMMUNICATIONS

ISO Control Room Staff will use the "party line" telephone circuit to implement this procedure. ISO will briefly inform all LCCs simultaneously of system conditions and issue an implementation directive as illustrated below. Each LCC, in alphabetical order, will repeat back the directed action to provide acknowledgment. When each LCC completes a directed action, the LCC will report the directed action has been completed and the implementation time of that action to ISO. These communications will be performed per the communications protocol required by NERC

Reliability Standard COM-002 and as stated in SOP-RTMKTS.0125.0020 – Communicate With Internal and External Parties.

Typical Messages:

Implementation

ISO to all LCCs:
"Implement ISO New England OP-4, Actions 1 and 2 at 0930."

Each LCC to ISO:
"Implement ISO New England OP-4 Actions 1 and 2 at 0930."

ISO to each LCC:
"That is correct."

ISO to REMVEC II:
"Implement ISO New England OP-4 Actions 3 and 4 at 1030."

REMVEC II to ISO:
"Implement ISO New England OP-4 Actions 3 and 4 at 1030."

ISO to REMVEC II:
"That is correct."

ISO to all LCCs:
"Implement ISO New England OP-4, Action 6 at 1100."

Each LCC:
"Implement ISO New England OP-4 Actions 6 at 1100."

ISO to each LCC:
"That is correct."

Confirmation

LCC (VELCO) to ISO:
"ISO this is VELCO. OP-4 Actions 1 and 2 were implemented at 1045."

ISO to VELCO:
"VELCO implemented OP-4 Actions 1 and 2 at 1045."

VELCO to ISO:
"That is correct."

Cancellation

ISO to all LCCs:
"Cancel ISO New England OP-4, Actions 2 and 1 at 1200."

Each LCC to ISO:
"Cancel ISO New England OP-4 Actions 1 and 2 at 1200."

ISO to each LCC:
"That is correct."

ISO to REMVEC II:
"Cancel ISO New England OP-4, Actions 3 and 4 at 1300."

REMVEC II to ISO:
"Cancel ISO New England OP-4 Actions 3 and 4 at 1300."

ISO to REMVEC II:
"That is correct."

ISO to all LCCs:
"Cancel ISO New England OP-4, Action 6 at 1400."

Each LCC to ISO:
"Cancel ISO New England OP-4 Actions 6 at 1400."

ISO to each LCC:
"That is correct."

Each LCC shall be responsible for keeping its member companies and ISO informed of all situations pertaining to implementation and cancellation of this Procedure. ISO will make notifications to the Department of Energy as required by ISO New England Operating Procedure No.10 - Emergency Incident and Disturbance Notification (OP-10). The LCCs will make notifications to state regulatory agencies as required. ISO will issue a report to the appropriate Technical Committee(s) following implementation of this procedure within 3 business days of the implementation.

V. IMPLEMENTATION OF AN ALERT

ISO Control Room staff will notify, as appropriate, the LCCs, generation stations (or designees) and Dispatchable Asset Related Demands as soon as OP-4 conditions are anticipated or underway by executing its responsibilities as declared by M/LCC 2.

VI. PUBLIC NOTIFICATIONS

Notifications associated with the forecasted or actual implementation of OP-4 will be conducted in accordance with OP-10 for Abnormal or Emergency Conditions. Power Advisories will be

issued by ISO via its external website. These Power Advisories will be triggered by the implementation of certain Actions of OP-4 as described below. These notifications are considered public information.

Power Caution

A Power Caution is triggered by the initial implementation of OP-4 Action 1. A Power Caution is defined as a notification that electric reserves can no longer be maintained using normal measures. Although full reserves are being maintained, utility personnel will begin to take further steps to continue to maintain these reserves.

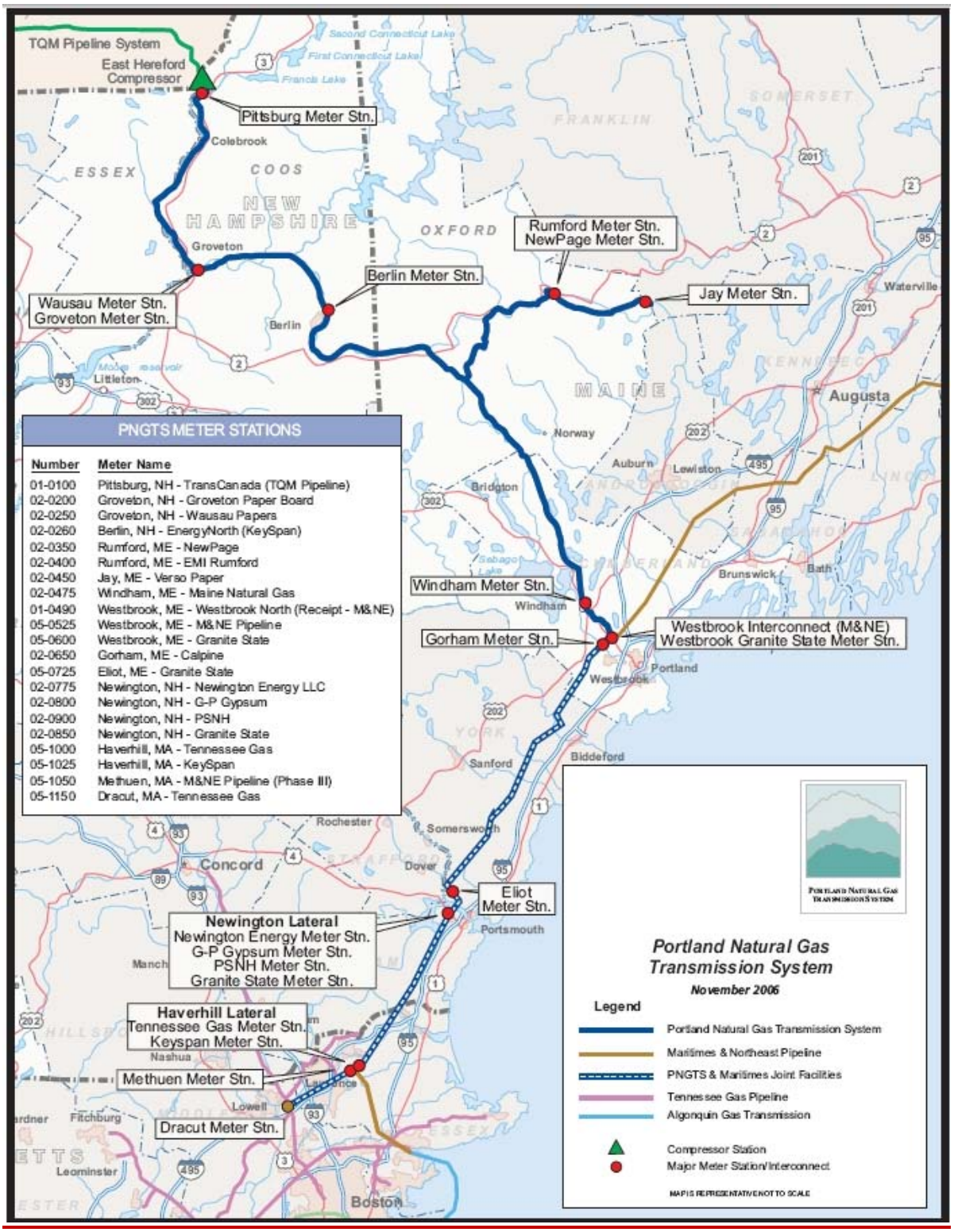
Power Watch

A Power Watch is triggered by the implementation of OP-4 Action 4. A Power Watch is defined as a notification that further steps to manage capacity could affect the public.

Power Warning

A Power Warning is triggered by the implementation of OP-4 Action 10. A Power Warning is defined as a notification for public appeals when an immediate reduction in power usage is necessary to avert overload of the electrical system. Public appeals are made when other efforts (e.g., emergency purchases, voluntary curtailment, contracted curtailment and voltage reduction) have been unsuccessful in bringing supply and demand back into balance.

Appendix K: Portland Natural Gas Transmission System Map



Appendix L: Maritimes & Northeast Pipeline Map

Appendix M: State Governments Disaster Checklists

State government responsibilities in pre and post disaster situations may include, but are not limited to the following:

State Governments Pre-disaster Checklist

- ☐ Lead statewide pre-disaster recovery and mitigation planning efforts.
- ☐ Establish and manage requirements and incentives for pre-event disaster recovery preparedness and planning as well as hazard mitigation actions.
- ☐ Identify recovery activities that are either primarily the responsibilities of state government or beyond the capabilities and authorities of local governments.
- ☐ Provide technical assistance and training to local governments and NGOs on state plans, programs, and other resources for disaster recovery.
- ☐ Implement and enforce applicable laws and regulations to protect the rights of citizens to ensure physical, programmatic and communications access to preparedness activities and services.
- ☐ Establish and aid enforcement of building and accessibility codes and land use standards, which can reduce vulnerability to future disasters.
- ☐ Ensure safety and health of state workers.
- ☐ Provide advice to employers and workers on worker safety and health.

State Governments Post-Disaster Checklist

- ☐ Coordinate with local, regional, tribal, and federal governments and agencies, private businesses and non-profit organizations to coordinate recovery planning and assistance to impacted communities.
- ☐ Receive, record, and manage federal grant resources; ensure efficient, nondiscriminatory, and effective use of the funds; and enforce accountability and legal compliance.
- ☐ Oversee volunteer and donation management and coordinate with federal Voluntary Agency Liaison.

- ☐ Facilitate and oversee a case management process that is accessible and inclusive.
- ☐ Assist local governments and communities with indentifying recovery resources.
- ☐ Establish metrics in coordination with the impacted communities to evaluate recovery progress and achievement of statewide disaster recovery objectives
- ☐ Develop and implement strategies for raising and leveraging recovery funds through private investment, charitable donations, and state sources such as emergency funds, taxes, fee and bonds that are within the state's authority to seek.
- ☐ Communicate timely information to the public and manage expectations, in coordination with local, tribal and federal stakeholders.
- ☐ Enact new or exemptions to existing state laws and/or regulations to promote recovery activities such as home reconstruction.
- ☐ Coordinate with federal law enforcement to prosecute disaster-related fraud, waste, discrimination and abuse, and recover lost funds.
- ☐ Ensure safety and health of state workers.
- ☐ Monitor oversight of worker safety and health.

Appendix N: Selected References and Links

Although not an exhaustive list, the following references (and their website links) were used to source much of the information found in this plan.

Travel Demand Policies for Saving Oil During a Supply Emergency, 2004.

Renewable Energy in Maine, American Council on Renewable Energy, 2010.

State Of Maine Comprehensive Energy Plan 2008-2009, 2009.

State of Maine Energy Emergency Management Plan, 2007.

State Energy Assurance Guidelines Version 3.1, NASEO, December 2009.

Overview of the Smart Grid— Policies, Initiatives, and Needs, ISO-NE, 2009.

Smart Grid & Cyber Security for Energy Assurance-Planning Elements for Consideration in States' Energy Assurance Plans, NASEO, 2010.

Downeast Reliability Project-Proposed New Transmission Line, Bangor Hydro Electric Company, 2010.

Central Maine Power Advanced Meter Infrastructure Project Summary, Central Maine Power, 2010.

Maine Wind & Ocean Energy Resource Guide, Environmental and Energy Technology Council of Maine, 2009.

Charting a New Path for Maine's Electricity Generation and Use, National Wildlife Federation, 2007.

The Maine Energy Handbook, Stephen Erario, September 2010.

NIST Framework and Roadmap for Smart Grid Interoperability Standards, Release 1.0, January 2010.

Maine 2010 State Profile, ISO-NE, January 2010.

Maine Energy Facts, Institute for Energy Research, 2009.

Database of State Incentives for Renewables and Efficiency, Maine Energy-Efficient Building Standards for State Facilities,

http://dsireusa.org/incentives/incentive.cfm?Incentive_Code=ME09R&re=0&ee=1.

2009 Annual Report, State of Maine Public Utilities Commission, February 2010.

State of Maine Hazard Mitigation Plan, October 2007.

State of Maine Concept of Operations Plan (CONOPS) for Incident Communications Interoperability Version 3.1, State Office of Information Technology and Maine Emergency Management Agency, March 2007.

Technical Assistance Briefs: NARUC Inventory on Gas Curtailment Planning, The National Association of Regulatory Utility Commissioners (NARUC), April 2005.

Technical Assistance Briefs: Issue Paper on Critical Infrastructure Protection, The National Association of Regulatory Utility Commissioners (NARUC), April 2005.

Website References

Maine Public Utilities Commission –
http://www.maine.gov/mpuc/

Efficiency Maine –
http://www.efficiencymaine.com/

National Resource Council of Maine –
http://www.nrcm.org

Maine Wind Industry Initiative –
http://www.mainewindindustry.com/

Maine Renewable Energy Association –
http://www.renewablemaine.org/

Bangor Hydro Electric Company –
http://www.bhe.com/

Central Maine Power Company –
http://www.cmpco.com/

ISO New England –
http://www.iso-ne.com/

Energy Information Administration –
http://www.eia.doe.gov/state/state_energy_profiles.cfm?sid=ME

Governor's Energy Office –
http://www.maine.gov/oeis/

Maine Emergency Management Agency –
http://www.maine.gov/mema/

Enterprise Products Partners LP –
www.epplp.com

Additional Web Resources

www.maineoceanenergy.com

www.oceanenergy.com

www.spragueenergy.com

http://www.mainelegislature.org

http://www.canaportlng.com

http://www.maine.gov/doc/mfs/windpower/briefing_material.shtml

http://www.windpoweringamerica.gov/newengland/projects.asp

https://wiki.colby.edu/display/stateofmaine2008/State+of+Energy+and+Climate+in+Maine

http://www.mainebiz.biz/article.php?RF_ITEM%5B%5D=Article$0@46840%3BArticle

http://www1.eere.energy.gov/femp/financing/eip_me.html

http://www.maine.gov/spo/specialprojects/OETF/

Energy Emergency Legislation
www.mainelegislature.org/legis/statutes/37-b/title37-Bch13sec0.html

Maine Emergency Alert System
www.mab.org/i4a/pages/index.cfm?pageid=3309

Emergency Communication
www.maine.gov/mema/programs/mema_prog_icomm.shtml

State of Maine IT Policies, Standards and Procedures
http://www.maine.gov/oit/policies/index.shtml

Energy Efficiency and Renewable Energy Information
http://www.maine.gov/oeis/alternativeenergy.html

Investigation into Needs and Standards for a Maine Smart Grid Coordinator
http://www.nrri.org/pubs/electricity/NRRI_ME_Smart_Grid_Jan12-02.pdf.

Maine Wind Energy Development Assessment: Report & Recommendations – 2012
http://www.maine.gov/oeis/Wind/Binder1.pdf

United States Computer Emergency Readiness Team
http://www.us-cert.gov/
http://www.mainesecurity.com/default.htm

Maine IT Security Homepage
http://www.maine.gov/oit/security/index.shtml

Appendix O: TEPPCO and Enterprise Pipeline Maps

TEPPCO

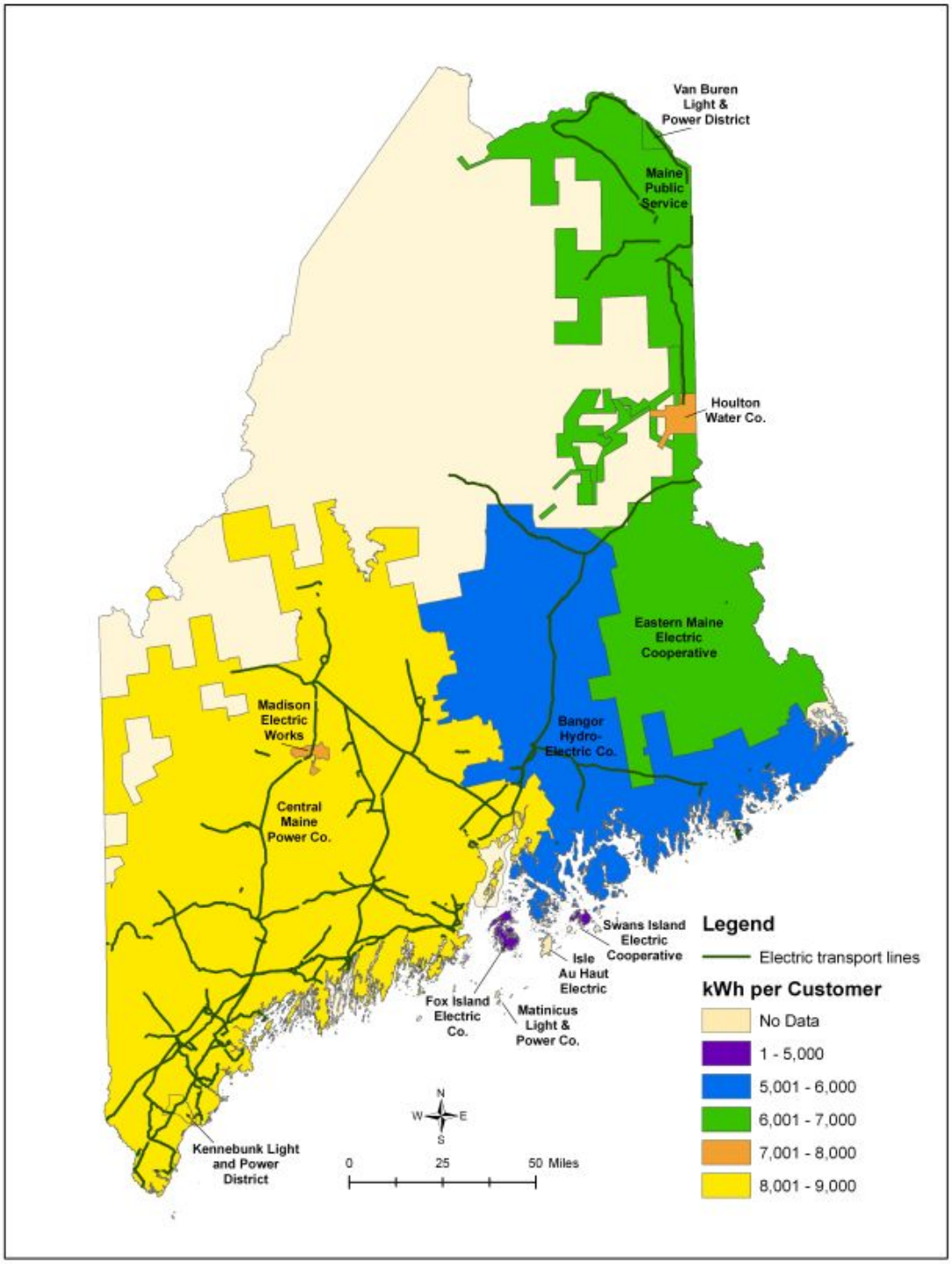
Combined System Map

ENTERPRISE GP HOLDINGS L.P.
TEPPCO

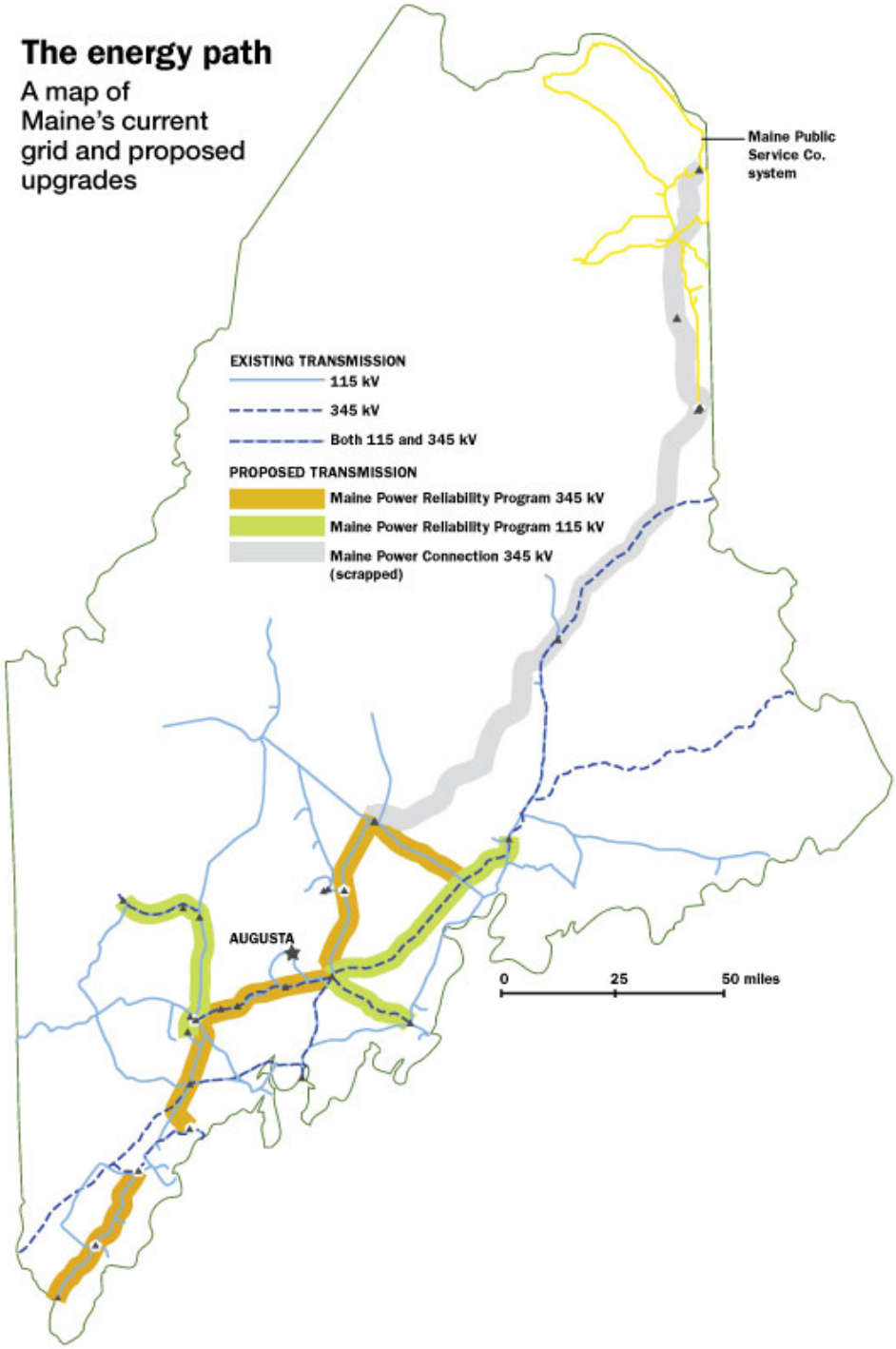
 1

Enterprise Partners

Appendix P: Electric Transmission Maps



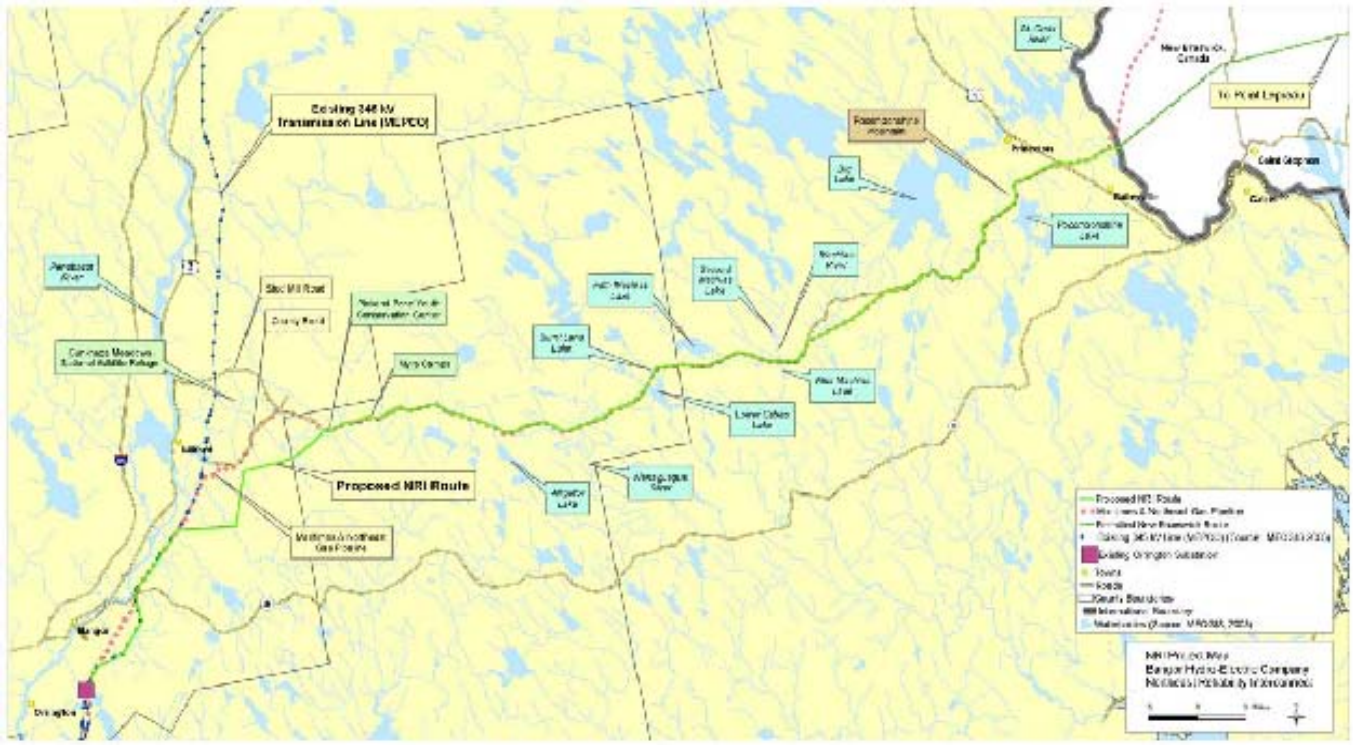
Source: State of Maine's Environment, Colby College Environmental Studies Program



Source: *mainepowerconnection.com*

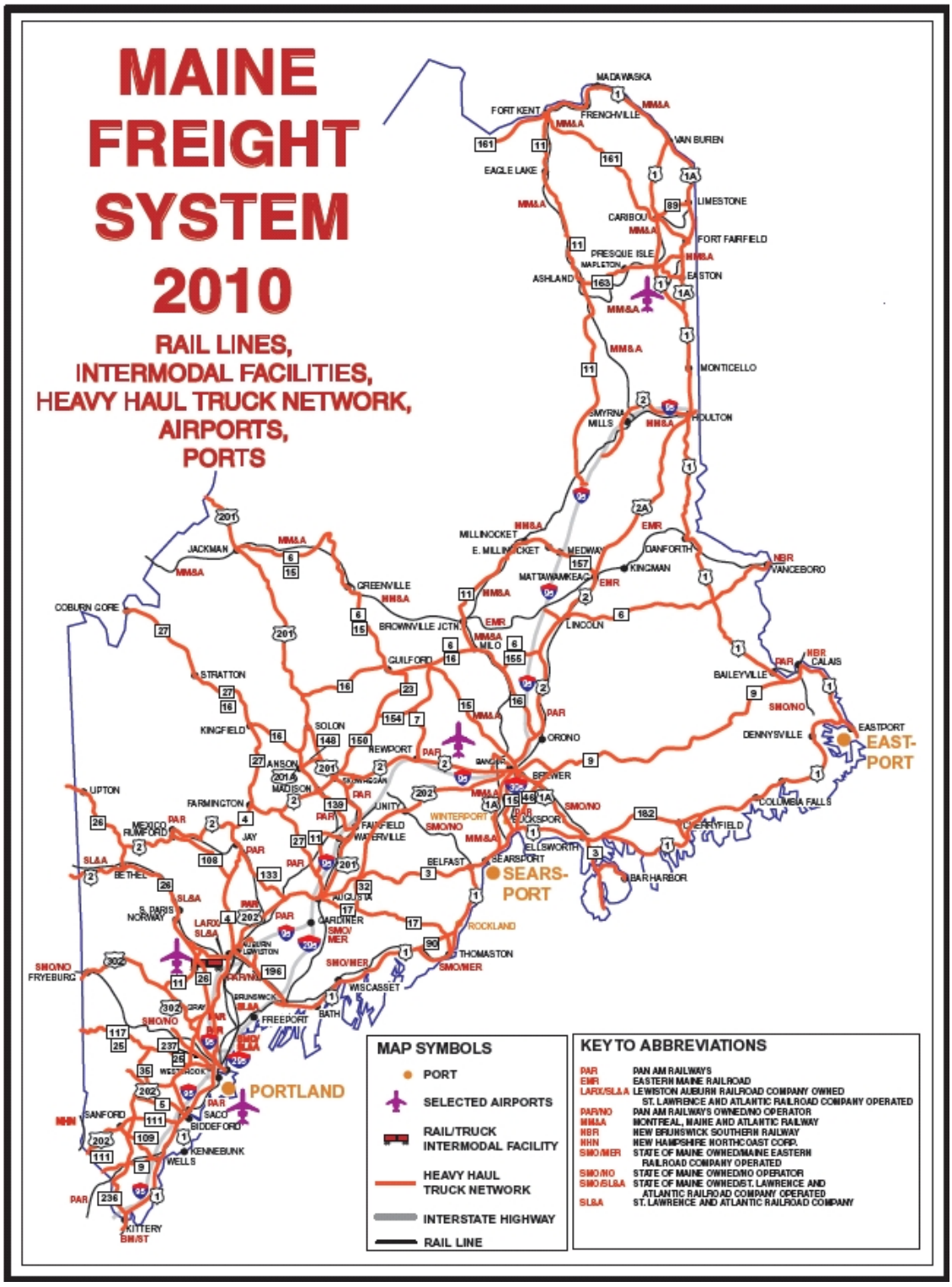
Appendix Q: Northeast Reliability Interconnect Proposed Transmission Route

Expanding Maine's Electricity Highway



Northeast Reliability interconnect
A Bangor Hydro Project

Appendix R: Maine Freight System Map



Appendix S: Energy Supply Disruption Tracking Process

Maine State Energy Office

State of Maine Energy Supply Disruption Tracking Process

U.S. Department of Energy
National Energy Technology Laboratory

Recovery Act – Enhancing State Government Energy Assurance Capabilities and Planning for Smart Grid Resiliency Funding

Opportunity No. DE-FOA-0000091CFDA Number 81.122
August 12, 2010

ENERGY SUPPLY DISTRUPTION TRACKING PROCESS

Recovery Act – Energy Assurance Planning – State of Maine

August 12, 2010

WORK PERFORMED UNDER AGREEMENT

DE-OE0000104

SUBMITTED BY

Maine Public Utilities Commission/State Energy Office

101 Second Street, SHS #18

Hallowell, ME 04333-0018

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I. Executive Summary

Maine's Energy Supply Disruption Tracking Process is based on the Virtual USA concept that integrates existing resources to provide real-time situational awareness with data from multiple sources and jurisdictions. This concept is also known as a Common Operating Picture (COP). The data (e.g., weather, electric utility outage data, and road closure) is integrated and can be analyzed, mapped and shared for interagency planning, supply disruption response and recovery.
To achieve this:

- The platform, Google Earth Enterprise (GEE) was selected and purchased.
- The Maine Public Utilities Commission (MEPUC) and the Maine Office of Technology Geographic Information Systems (MEGIS) are collaborating to strengthen and improve the MEPUC's current energy infrastructure GIS application and include electric outage information in the application.
- The MEPUC, the Maine State Energy Office (MESEO), and the Maine Emergency Management Agency (MEMA) will determine which energy data sets and base data sets require creation or improvement and plan the best way to gather the data.
- MEMA and MEGIS will work to determine which data layers to make available in the Emergency COP. This includs energy data and other available, real time data, such as road conditions. Data sensitivities and permissions will be determined and managed by the data owners in conjunction with MEMA.

II. Background

In the Project Management Plan, Task 4 – Develop Energy Supply Disruption Tracking Process (ESDTP), which is defined as the process or mechanism for tracking the duration, response, restoration and recovery time of energy supply disruption events, is described as the centerpiece of Maine's Energy Assurance plan. Maine's critical energy infrastructure spans a large geographic area that is sparsely populated. This network of energy and communications utilities is the lifeline of the state's communities. Maintaining these networks and recovering quickly from disruptions is critical to ensure Maine citizen's safety and security.

Because Maine is a sparsely populated state with a relatively small state government, response to emergencies, including disruptions of energy supply, is a joint responsibility shared by many agencies and coordinated by the Governor's office (usually through MEMA in partnership with the multi-agency Emergency Response Team (ERT)). For example, Maine's electric utilities are required to report outage information to the PUC (a member of the ERT). Today, this data is provided in a variety of formats, including email text and Excel spreadsheets and shared with ERT members via email. In addition, pursuant to state statute, owners of petroleum storage facilities are required to submit a report to the State Planning Office on the first and third Monday of each month with total inventories of petroleum product stored and imported in Maine. This data also arrives in a variety of inconsistent formats such as word documents and email and is not currently shared with other agencies regularly.

Today, MEMA uses a Statewide Incident Management System (SWIMs) GIS application to view some data (for example, stream gauges), but the platform is old and limited and requires custom programming to add additional data. MEMA also uses WebEOC to share information with its partners. This is largely in the form of text in incident logs and most of the data must be input manually.

While Maine has struggled to better anticipate and respond to energy supply disruptions, it has also recognized a need to better prepare for all hazards emergencies. Among the Recommendations included in the April 2010 After Action Report from the October 29-30, 2009 Maine State Functional Exercise, conducted as a joint effort by MEMA, Federal Emergency Management Agency (FEMA), and the Department of Homeland Security (DHS) is the Recommendation related to Observation 5.4 that "MEMA should develop a comprehensive common operating picture system that incorporates improved utility status information flow and builds on and improves the utility outage information available through the PUC." This echoed a need, recently recognized by the Maine Homeland Security Strategy working group, for a "Common Operating Picture" to better respond to emergencies.

With all of this in mind we have taken a broad view of the energy supply disruption process deliverable for Maine. We consider it a component of our (to be built) COP.

III. Energy Supply Disruption Tracking Process (ESDTP)

A. Main Features

As previously stated, the ESDTP is a tool for tracking the duration, response, restoration and recovery time of energy supply disruption events. We conceive of the ESDTP as part of a Common Operating Picture (COP) that provides situational awareness for state and local agencies in Maine. One of the primary benefits of the COP is that all participants in an event have access to the same data, tools, and reports. The center of our ESDTP is the Google Earth Enterprise (GEE). The infrastructure will also consist of custom web pages, WebEOC crisis information management software, hand held data collection devices, ESRI Desktop and ArcServer, and automated data feeds.

There are two major components to the establishment of Maine's ESDTP. First, the MEPUC will integrate existing utility outage information into an internet-based, geo-referenced user display that can be access by all emergency management and energy officials with a need to know. This portion, the Local Operating Picture (LOP), will be controlled and directed by the MEPUC. Second, the same platform will be populated by data from a variety of other static and real-time data sources, such as road closures, stream gauges and underground fuel storage facilities. This COP will be controlled and directed by MEMA.

In addition to the electric utility outage data, there are a number of GIS data sets, many directly energy related, already created and available at the state and local level. The process of identifying those data sets has begun and will continue. This task is being led by MEMA. Other sources of data, such as petroleum deliveries and inventories that are collected by state agencies but will be converted to GIS format for the ESDTP. Those are also being identified. It is our expectation, based on the observation of other COP or Virtual USA projects, that once the project is started we will be approached by data owners, thus simplifying our search.

It is important to note that the data "owners" will maintain control over the data and can dictate which other entities have permission to view it. The "owners" (e.g., Maine's Department

of Environmental Protection (MEDEP) "owns" the underground storage tank location data) of the data will also continue to manage and update the data.

The GEE will improve this process by providing primary stakeholders the ability to control the uploading and access to their data in an easy to understand process. These stakeholders will also be able to add near real time data to the Common Operating Picture using hand held data collection devices in the field.

Because we anticipate a large number of data sets, the GEE will include a database to receive and manage these data. Typically during an emergency situation, a large amount of temporal data is generated and utilized. The GEE will provide the ability manage and examine both current data and historical data which help both in immediate assessment and decision making processes, and in planning exercises.

Providing stakeholders with the opportunity to have more control over their data facilitates the building of data sharing relationships, which, along with educating stakeholders about the value of the process, will be a major benefit to the state and establish relationships that will be critical during emergencies, including energy supply disruptions.

B. Status of Implementation

Maine has executed a purchase agreement with NTConcepts for the purchase of Google Earth Enterprise. This enables Maine to create custom Google Earth Globes. The purchase includes two Google Earth Enterprise Appliances comprised of:

Google Earth Enterprise Fusion Server
Google Earth Enterprise Earth Server
Hardware servers
8000 Google Earth Enterprise Licenses.

Currently Maine is waiting for the Google Earth Appliance to be installed in the MEGIS data centers. NTConcepts has loaded a subset of Maine data into a temporary Google Earth Enterprise Appliance within their infrastructure. Maine's access to this server will begin August 16. This will enable MEGIS to begin learning the software begin custom development on the MEPUC's LOP.

The first phase of implementation will include creating the PUC LOP and integrating it with the MEMA COP. We are working with Maine's two largest electric utilities (Central Maine Power (CMP) and Bangor Hydro-Electric (BHE) to complete the automated data transfer agreements and scripts. BHE is almost complete and CMP is in initial stages. This process involves the following steps:

1. Import utility power outage data electronically from selected utility companies. This will involve working with the utility staff, MEPUC, and MEGIS to develop and implement an electronic data delivery (EDD) format.
2. Implement required security for data transmission which will be determined during development of the EDD.
3. Develop web based reports for presentation of the tabular data that are linked to the GEE.
4. Develop web based reports that incorporate the visual representation of information in GEE and associated tabular data.

5. Migrate the PUC infrastructure data and presentation currently in the ArcMap to the GEE client.

On a parallel track, work has begun to create the MEMA COP. This process involves the following steps:

1. Migrate the current SWIMS application from the commercial Google Earth Client to the GEE client.
2. Develop EDDs for oil and gas delivery schedule data/forms with MESEO.
3. Inventory other state agency data.
4. Develop and implement custom reports for WebEOC. (This will enable a user in WebEOC to select a specific dataset and have it linked to the GEE to enable visualization of the data in the GEE client.)
5. Establish a process to allow access as needed during an event. This includes a process that will enable MEPUC (and other data owners) and MEMA to assign security privileges as required for different users.

We expect to begin to build the PUC LOP and the GEE COP for the GEE client on August. We expect to begin testing the LOP and COP in September, including using it in a table top exercise in conjunction with the National Association of Regulatory Utility Commissions (NARUC) on September 14, 2010. We expect to have the LOP and COP fully implemented by June 2011. In order for the application to maintain relevance, we also anticipate continuous updating and refinement.

C. Types and Sources of Data

The COP will consist of many “base” data layers, such as roads, hydrography, schools, and statewide orthoimagery. See Appendix A and B for a more complete list of data. In addition there will be energy specific layers including:

1. Electric utility outage data, supplied when reporting thresholds are reached and periodically during an event. Utilities are the data source, and the outage data will be managed by the MEPUC.
2. Petroleum delivery and storage data, provided by the petroleum companies pursuant to statue to the MESEO.
3. Underground fuel storage facility location and capacity. Collected by DEP field personnel.
4. Planned: Location of wind, solar and other renewable energy installations, provided by MESEO.
5. Planned: Tracking Smart Grid implementation, MESEO/MEPUC.

D. Roles and Responsibilities (including data housing)

1. Application

Pursuant to an MOA, MEGIS will develop and implementing the COP. Thereafter, MEGIS will host and support the COP. Pursuant to agreement with MEMA and the MEPUC, those

agencies will pay a fixed fee for the first three years, other agencies will pay a per user fee, which is designed to fully support the application. MEMA will manage access to the emergency management globe. GEE was purchased with funding from this grant.

2. Data

The electric utility outage data will remain the responsibly of the MEPUC. The utilities will continue to generate the data and the MEPUC will make the information available to MEMA and other response agencies on an as-needed basis, like it is today. Electric utility infrastructure data is available to the PUC and protected from disclosure pursuant to MRSA 35-A §1311-B.

Other data layers will continue to be owned and managed by the originating agency, such as the Maine Department of Transportation (MEDOT), MEDEP, MESEO and local agencies such as city fire departments and school systems. MEMA will determine which layers are contained and/or available to emergency responders. As mentioned above, the GEE COP will have a database to receive and manage the data. That will be managed by MEMA and MEGIS.

3. Security

One reason the GEE was selected as our platform is that it comes with a well developed, robust, and easy to implement security system. This enables the primary administrator of the COP (MEMA) to manage access to each data set, including editing and downloading "rights". This is accomplished through implementing user groups and user roles. When a user logs on they will see only data that has been preauthorized. For example, the detailed utility infrastructure data will only be viewable by the PUC. The security will be implemented in such a way that users from other groups will not even see that this detailed infrastructure data is in the COP.

MEMA will have responsibility for determining the groups and roles for all of the users accessing the COP. The security for these groups and roles, however, cannot over ride the security implemented by the individual data owners, such as the MEPUC.

The security systems used for the groups, roles, and permissions, is managed through an easy to use application and does not require a computer programmer to operate. This makes it possible for the MEPUC or MEMA to change existing or add new groups and roles and permissions on the fly in emergency situation.

E. The ESDTP and Maine's Energy Assurance Plan

In June 2008, the Maine's Energy Office (now the MESEO) published "The State of Maine Energy Emergency Management Plan" (the Plan).[1] According to the Executive Summary, "The primary purpose of this comprehensive and integrated

State Energy Emergency Management Plan is to provide the Governor, the Legislature, the local governments, the public utilities, the private energy industry and energy consumers with a clear understanding of the state's plans, processes, priorities, programs, personnel and timeframes to address the critical energy emergency issues of the 21st Century." In accordance with this Energy Assurance grant, the plan will be updated by the MESEO (and a contractor) and become the Energy Assurance Plan for Maine (EA Plan) by February 2011. The new EA Plan

will incorporate new and existing energy portfolios. The EA Plan will also include new and emerging technologies and concepts including: Smart Grid applications and vulnerabilities, critical infrastructure interdependencies, cyber security.

The ESDTP, as a tool for energy emergency planning, response, and recovery will be included in the EA Plan.

Appendix A
Data layers in the PUC LOP

Electric Substations **Electric points - other**	Dispatch Centers
	Hand Hole
	Light Pole
	Manhole
	Power Pole
	Switch Gear
	Substation
	Transformer Cabinet
	Transmission Structure
	Underground Residential District
	Vertical
	Vertical Line Tower
	Vertical Line Tower Post
Electric Transmission Lines (underground/ overhead)	69kV
	115 kV
	138 kV
	345 kV
Actual Electric Service Areas	Utility Name
Authorized Electrical Service Areas	BHE
	CMP
	EMEC
	MPS
Roads	E911 roads
	DOT roads
	Major routes
Hydrography	NHD (National Hydrography Data Set) 24k
	Hydro100Arc – Rivers and streams
	Hydro100Poly – Lakes and ponds
	HydroMajor
Town and County Boundaries	Counties 250
	Counties100
	Towns24l
	Towns100l
	Towns250l
	Towns24

	Towns100
	Towns250
Base	Northeast
	Mask24
	Mask100
	Mask250
Imagery Municipal All imagery may be viewed at http://megiswebmaps.maine.gov/orthoviewer/default.aspx	Augusta – Manchester 2008, 1m, 5m
	Bar Harbor 2004, 1m, 5m
	Bar Harbor 2008, 1m, 5m
	Bar Harbor CIR 2008
	Central Coastal 2006, 1m, 5m, 25m
	Cumberland County 2001, 1m, 5m, 25m
	Fort Fairfield 2003, 1m, 5m
	Hampden 2006, 1m, 5m
	Kittery 2006, 1m, 5m
	Lewiston – Auburn 2006
	Portland 2006, 50cm, 5m
	South Portland 2005, 50cm, 5m
	York 2005
	York County 2007, 1m,5m,25
Imagery	Baxter 2004
	Debsconeags 2005
	Katahdin Lake 2006
	Low Tide Down East 2009
	Low Tide 2008
	Low Tide 2004
	Low Tide Central Coast 2001
	Low Tide Delorme 2003
	GeoLibrary 1 ft 2003 - 2005
	GeoLibrary 2 ft 2003 - 2005
	NAIP 2009
	NAIP 2007
	NAIP 2006
	USGS DOQQ 1996 - 1998
	SPOT 2004
	SPOT 1998
	Color Topographic Maps
	• Topos 1:24,000
	• Topos 1:100,000
	• Topos 1:250,000
	Topes overview (250k)
	BW Topographic Maps

	• ToposBW 1:24,000
	• ToposBW 1:100,000
	• ToposBW 1:250,000
	• TopesBW overview (250k)
	Maine Nautical Charts
	• NOAA_10k_charts
	• NOAA_15k_charts
	• NOAA_20k_charts
	• NOAA_40k_charts
	• NOAA_50k_charts
	• NOAA_80k_charts
DEP Data	Fuel Underground Storage Tanks
	Fuel Above Ground Storage Tanks

Appendix B
Current Data Layers in the Maine COP

Dams (restricted)	
	Point Data Grouped by Dams Hazard Potential • Archive • High • Low • Significant • Unclassified Source: MEMA's Dam Safety Application
National Weather Service	
	Shaded NWS zone • Warnings (shaded red polygon) • Watches (shaded orange polygon) • Advisories (shaded yellow polygon) Lines • Watch Areas (red/yellow) Source: National Weather
511 Traffic Data	
	Point data grouped by Event Cause • MaineDOT
River/Stream Gauges	
	Point data displayed as percentage of flood stage and trend indicator • Stations above flood • Stations between 90% and flood • Stations between 80% and 90% • Stations between 70% and 80%

	• Stations between 60% and 70% • Stations below 60% • Stations with no flood stage set Source: USGS
Recent Earthquakes	
	Point data with depth and magnitude.
Recent Large Fires	
	Point data for large fires (forest) reported by ground or satellite
Weather Reports	
	Point data with recent observations from • MaineDOT • METAR (airports) • Citizens

Appendix T: Renewables Portfolio Standard

Maine Incentives/Policies for Renewables & Efficiency

Renewables Portfolio Standard

Program Overview:

State:	Maine
Incentive Type:	Renewables Portfolio Standard
Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Fuel Cells, Municipal Solid Waste, CHP/Cogeneration, Tidal Energy, Other Distributed Generation Technologies
Applicable Sectors:	Investor-Owned Utility, Retail Supplier
Standard:	Total: 40% by 2017 Class I (New Resources): 10% by 2017
Technology Minimum:	No
Credit Trading:	Yes (NEPOOL-GIS)
Authority 1: Date Enacted: Date Effective:	35-A M.R.S. § 3210 1999 3/2000
Authority 2: Date Enacted:	35-A M.R.S. § 3210-C 6/1/2006
Authority 3: Date Enacted: Date Effective:	CMR 65-407-311 10/22/2007 11/6/2007

Summary:

In September 1999, Maine's Public Utilities Commission (PUC) adopted rules for the state's Renewable Resource Portfolio Requirement, pursuant to the state's 1997 electric-utility restructuring law. The rules require each competitive electricity provider, including standard offer providers, to supply at least 30% of their total retail electric sales in Maine using electricity generated by eligible renewables and certain energy-efficiency resources. However, at the time of passage, the required percentage of renewables was actually lower than the then existing percentage of renewables supply.

To qualify, electricity must be generated by a facility no greater than 100 megawatts (MW) in capacity that uses fuel cells, tidal power, solar arrays and installations, wind power, geothermal power, hydropower, biomass power or generators fueled by municipal solid waste in conjunction with recycling. Electricity generated by efficient combined heat and power (CHP) facilities and other systems that qualify as "small power production facilities" under the federal

Public Utility Regulatory Policies Act of 1978 (PURPA) also are eligible. The PUC has since designated this 30% standard the "Class II" standard.

In June 2006, Maine enacted legislation (L.D. 2041) creating a renewable portfolio *goal* to increase *new* renewable-energy capacity by 10% by 2017. Eligible *new* renewables include those placed into service after September 1, 2005. Unlike the Class II standard, municipal solid waste facilities and CHP systems are not eligible under the new renewables goal, and hydropower facilities must meet all state and federal fish passage requirements. New wind-power installations may exceed 100 MW in capacity.

Public Law 403 of 2007 converted the 2006 goal into a mandatory standard, which the PUC has since designated the "Class I" standard. The schedule for the Class I standard is as follows:

- 1% for the period from 1/1/2008 to 12/31/2008
- 2% for the period from 1/1/2009 to 12/31/2009
- 3% for the period from 1/1/2010 to 12/31/2010
- 4% for the period from 1/1/2011 to 12/31/2011
- 5% for the period from 1/1/2012 to 12/31/2012
- 6% for the period from 1/1/2013 to 12/31/2013
- 7% for the period from 1/1/2014 to 12/31/2014
- 8% for the period from 1/1/2015 to 12/31/2015
- 9% for the period from 1/1/2016 to 12/31/2016
- 10% for the period from 1/1/2017 to 12/31/2017, and for each year thereafter

The PUC has approved the use of NEPOOL Generation Information System (GIS) certificates (which are similar to renewable-energy credits, or RECs) to satisfy the portfolio requirement. GIS certificates are awarded based on the number of kilowatt-hours (kWh) of eligible electricity generated. GIS certificates used to meet the Class I standard may not also be used to satisfy the Class II standard. Legislation enacted in June 2009 (L.D. 1075) provides a 1.5 credit multiplier for eligible community-based renewable energy projects (see the Community-Based Renewable Energy Production Incentive for more information).

The PUC sets an alternative compliance payment (ACP) that utilities may pay instead of satisfying the standard by procuring GIS certificates. The PUC set the ACP base rate for the Class I standard at $57.12 per megawatt-hour (MWh) in 2007; this rate is adjusted annually for inflation beginning in 2008. The 2010 ACP rate is $60.93. Revenues from ACPs will be directed to the state's Renewable Resource Fund).

The PUC may review the Class I standard to determine if progress has been sufficient. The PUC may suspend scheduled increases in the Class I standard under certain circumstances. Electric providers that fail to comply with the standard are subject to certain penalties, including license revocation, an optional payment into the Renewable Resource Fund, or other monetary penalties determined by the PUC. However, the PUC may waive penalties if it determines that a utility made good faith efforts but could not reasonably satisfy the standard due to market conditions.

Maine Wind Energy Goals

In addition to the above Maine Renewables Portfolio Standard, there are three goals for wind-energy development in Maine: (1) at least 2,000 MW of installed capacity by 2015; (2) at least 3,000 MW of installed capacity by 2020, of which there is a potential to produce 300 MW from facilities located in coastal waters or offshore; and (3) At least 8,000 MW of installed capacity by 2030, of which 5,000 MW should be from facilities in coastal waters or offshore. The first two goals were established in April 2008 (L.D. 2283), and the third was established in April 2010 (L.D. 1810). The Maine PUC issued a request for proposals in September 2010 for long-term contracts to supply capacity, energy and RECs from offshore wind energy projects (pilot) or tidal energy projects (demonstration), as directed by L.D. 1810.

Appendix U: ISO-New England 2011-12 State of Maine Profile

ISO new england

Maine

2011-12 State Profile

The New England electric grid is an 8,000-mile high-voltage transmission system that connects electric utilities, publicly-owned electric companies, power generators, suppliers, alternative resources, and end users in the six-state wholesale electricity marketplace. This is a brief profile of the electric grid and wholesale markets serving Maine based on information from New England's regional system planning process and wholesale market reports.

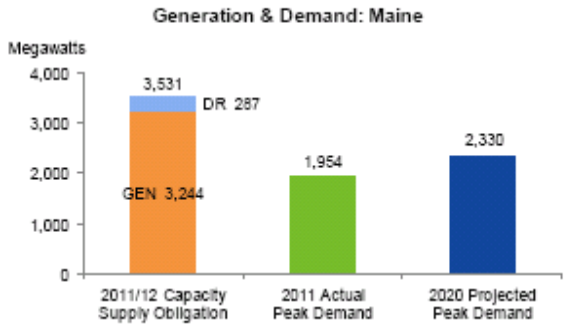
Introduction

Maine represents approximately 9% of the population in New England and 9% of the region's total electricity consumption.

The state relies on both in-state resources and imports of power over the region's transmission system to serve electricity customers. Transmission, generation, and demand resources are being added to ensure that the reliability of the system is maintained. In addition, Maine is attracting large wind-power proposals.

Growth in Demand

In the *2011 Regional System Plan*, ISO New England (ISO) forecasted the state and the region's overall electricity demand to grow at a rate of 0.8% annually over the next decade, below the 1.1% rate projected for New England. The ISO forecasted the state's peak (summer) demand to grow 1.7% annually over the next decade–above the 1.4% rate projected for the region.



New England's 2011 peak demand for electricity, which occurred on July 22, was the second highest on record. New England's overall demand for electricity fell sharply from 2007–2009, primarily due to the recession, then climbed in 2010, but has remained below 2003–2008 levels. The ISO issues a new 10-year forecast each year in April based on updated economic data.

In 2011, the ISO created a methodology for a discrete EE forecast to estimate the long-term effects of state-sponsored EE programs. This methodology will look beyond the EE committed three years into the future through the Forward Capacity Market (FCM).

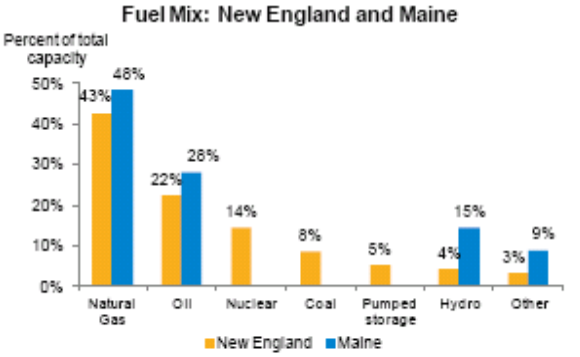
Maine has been proactive in developing programs and initiatives to promote EE and reduce the growth in electricity use, including peak demand.

Generating Resources

The total capacity of existing generating plants in Maine is approximately 3,100 megawatts (MW). This is approximately 10% of the total capacity in New England. About 3,200 MW in Maine cleared in the FCM with obligations to be available from June 1, 2011–May 31, 2012. Generator availability has increased systemwide in New England since the start of competitive markets, from 81% in 1999 to 88% in 2010. At any given time, however, individual generators may not operate due to planned or unexpected outages, environmental restrictions, or other reasons. Some resources do not operate because their offers to sell electricity in the wholesale market are above the market-clearing price. In Maine, generators are owned and operated either by private generation companies or consumer-owned utilities.

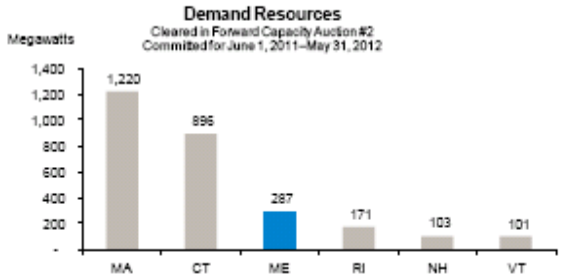
Fuel Mix

Natural gas and oil are the primary fuels for more than 60% of the existing generating capacity in New England and about 70% of the capacity in Maine.



Demand & Price Response

New England has about 2,800 MW of customer-side Demand Resources (DR), that can reduce demand on the power grid through both active measures, such as shifting to on-site distributed resources, and passive measures, such as energy efficiency (EE). DR is growing with efforts to more fully integrate it into the wholesale electricity markets. Maine has about 300 MW of DR with obligations in the FCM—equivalent to 15% of the state's peak demand.



Proposals for New Resources

In New England, the FCM provides opportunities for existing and new generation (supply), DR, and imports to compete to provide the capacity resources the region needs to meet future reliability requirements. Resources must qualify, clear (i.e., be selected) in the auction, and then perform when called upon by the ISO to be eligible for capacity payments.

Through a series of annual auctions, ISO has procured resources to meet reliability needs for the five-year period June 1, 2010–May 31, 2015. In this period these auctions cleared:

- More than 70 MW of *new* generation resources from Maine, representing 2% of the new generation cleared in New England, and
- More than 330 MW of *new* DR from Maine, representing 12% of the new DR cleared in New England.

The ISO will conduct the sixth auction (FCA-6) in April 2012, for resources needed in the 2015–2016 timeframe.

Connecting New Generating Resources

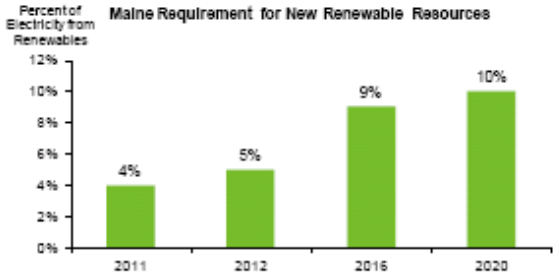
In order to connect to the grid, a proposed generator must be studied and approved under the ISO's Generator Interconnection Procedures to ensure the project will not adversely impact the reliability of the electric grid. This is known as the "queue" process.

About 1,350 MW of proposed resources in Maine (primarily wind) have entered the ISO queue, representing 27% of the proposals in New England as of December 2011. About half of the proposed renewable resources in the region are in Maine. (Additional projects are proposed in northern Maine, outside of the ISO region.) Historically, not all of the proposals in the queue have been developed, but it is an indication of the potential for new resources. ●●●

Renewable Resources

To meet Maine's renewable portfolio standard (RPS), utilities and competitive suppliers must obtain specified percentages of the electricity they provide to customers from renewable sources, or make alternative compliance payments.

Maine requires 30% of total retail electricity sales to come from renewable resources. This requirement is met with existing resources. In addition, Maine requires development of new renewable resources defined as resources developed after 2005. The requirement for new renewable resources increases 1% annually from 1% in 2008 to 10% in 2017.

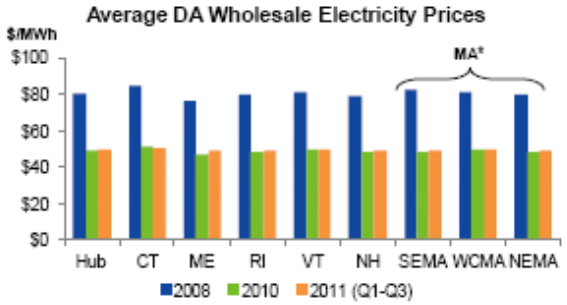


Recently, the state established goals of developing 3,000 MW of onshore wind by 2020 and an additional 5,000 MW of offshore wind by 2030. Since 2008, three onshore wind projects have been completed in Maine: the 114 MW Stetson Wind farm in Washington and Penobscott Counties, the 30 MW Dundee Wind farm in Penobscott County, and the 130 MW Kibby Wind farm in Franklin County. ●●●

Wholesale Market Prices

Locational pricing is a key feature of New England's wholesale electricity markets. The ISO administers Day-Ahead (DA) and Real-Time (RT) Energy Markets and calculates prices for eight zones in New England. Each state is one zone, except for Massachusetts.

Average wholesale prices have dropped with lower demand and fuel prices. Prices remain well below 2008 levels. ●●●



* Massachusetts has three zones: Southeastern Mass. (SEMA), Western/ Central Mass. (WCMA), and Northeastern Mass./Boston (NEMA/Boston).

Transmission

Central Maine Power Co. (CMP) is finalizing construction of a major 345-kilovolt (kV) upgrade to the transmission system from central Maine to southeast New Hampshire, known as the Maine Power Reliability Program (MPRP). The project is being developed to keep pace with growing demand for electricity and to ensure the reliability of the region's transmission system. MPRP is expected to be operational in 2012. Changes in the forecast of electricity demand or development of market-based responses to system needs can affect the need for transmission projects, and the ISO reevaluates these needs as part of the planning process. New England can import 1,000 MW of power from New Brunswick over two 345 kV tie lines that connect in northern Maine. ●●●

Strategic Planning Initiative

ISO and stakeholders are evaluating several key risks that will impact the region's power system and wholesale electricity markets. Near-term risks include resource performance and flexibility, and increased reliance on natural gas-fired capacity. Long-term risks include potential retirement of generators, integration of a greater level of variable resources (e.g., wind and solar), and alignment of markets with planning. ●●●

About ISO New England

ISO New England is the Independent System Operator responsible for ensuring the reliable operation of the New England electric grid, administration of the region's wholesale electricity markets, and administration of the regional Open Access Transmission Tariff, including regional system planning. The ISO is a not-for-profit corporation governed by an independent Board of Directors. The ISO does not own transmission or generation assets and has no financial interest in any companies participating in the region's wholesale electricity markets. ●●●

Sources and Additional Information

U.S. Census Bureau, *2011 Regional System Plan*, *2010 Annual Markets Report*, FCA results, and other public ISO information.

ISO New England: **www.iso-ne.com**

ME Public Utilities Commission: **www.maine.gov/mpuc**

State Profile updated December 2011, ISO New England Inc.

Appendix V: 2012-13 Directory of Energy Emergency Management Contacts and Resources

STATE OF MAINE

2012-13 DIRECTORY OF ENERGY EMERGENCY MANAGEMENT CONTACTS AND RESOURCES

DEVELOPED FOR THE MAINE ENERGY ENERGY ASSURANCE & EMERGENCY MANAGEMENT PLAN

July 2012

STATE OF MAINE
OFFICE OF THE GOVERNOR
22 STATE HOUSE STATION
AUGUSTA, MAINE
04333-0001

PAUL R. LEPAGE
GOVERNOR

KENNETH C. FLETCHER
DIRECTOR
GOVERNOR'S ENERGY OFFICE

July 2012

Honorable, Governor Paul R. LePage
State of Maine Office of the Governor
1 State House Station
Augusta, Maine 04333-0001

RE: 2012-13 Directory of Energy Emergency Management Contacts and Resources

Dear Governor LePage:
The Governor's Energy Office is responsible for developing and revising the State of Maine Energy Assurance and Emergency Management Plan. The purpose of the Energy Assurance Plan is to provide the Governor, the Legislature, the Executive Departments, the energy industry and the general public with a clear, concise and comprehensive blueprint and strategy to address a potential or actual energy emergency caused by a supply disruption, a rapid and unsustainable increase in energy prices or other energy emergency situation.

The GEO created Maine's first energy emergency plan in 2008 in response to Maine citizens' increasing vulnerability to rapid price escalations, fossil fuel supply curtailments and infrastructure disruptions. The American Recovery and Reinvestment Act (ARRA) provided states with an opportunity to revise the plan to build greater capacity and resiliency for energy assurance and emergency planning and response.

The *2012-13 Directory of Energy Emergency Contacts and Resources* is one component of a revised Energy Assurance Plan. This directory is intended as an easy reference to public and private energy assurance and emergency management resources and is structured to be a dynamic and continuously updated source of information.

Sincerely,

Kenneth C. Fletcher

Kenneth C. Fletcher
Director
Governor's Energy Office

State of Maine
Energy Assurance and Emergency Management Plan

Contents

Acknowledgements

This Directory was prepared the Maine Governor's Energy Office.

We would like to thank all the contributing organizations, departments and agencies and their staffs who provided assistance and information including the Maine Emergency Management Association, Maine Public Utilities Commission and State Planning Office.

Governor's Energy Office
22 State House Station
Augusta, ME 04333
(207) 287-8927

July 2012

Introduction

About This Directory

This directory is intended as an easy reference to public and private energy assurance and emergency management resources as a component of the State of Maine Energy Emergency Management Plan (MEEMP).

The purpose of the MEAEMP is to provide the Governor, the Legislature, the Executive Departments, the energy industry and the general public with a clear, concise and comprehensive blueprint and strategy to address a potential or actual energy emergency caused by:

- A supply disruption;
- A rapid and unsustainable increase in energy prices; or
- Other energy emergency situations.

The Energy Assurance Plan updates the 2008 State Energy Emergency Management Plan and strives to:

- Identify energy hazards;
- Coordinate with state agencies and private sector stakeholders on areas of critical concerns;
- Collects and disseminate critical energy information to the Governor, Legislature and the public;
- Communicate with relevant international, federal, state and local officials to maintain the effectiveness of the MEEMP; and
- Develop strategies to work with ISO New England, natural gas producers, heating fuels providers and electricity generators to achieve energy assurance.

The directory is intended as a dynamic document open to constant revision as additional resources are added, current contacts change and the overall MEEMP is updated and amended.

The directory is a resource guide only! It does not provide legal or policy guidance or advice. Please contact individual organizations for the most current and accurate information.

Directory of Energy Emergency Contacts and Resources

A

Administrative and Financial Services – Bureau of General Services

The Bureau of General Services manages the State of Maine's fuel inventory for State facilities and buildings.

(207) 624-7314
Bureau of General Services
77 State House Station
Augusta, ME 04333
www.maine.gov/bgs

American Gas Association

The American Gas Association represents companies delivering natural gas to customers to help meet their energy needs. AGA advocates the interests of its members and their customers, and provides information and services promoting efficient demand and supply growth, and operational excellence, in the safe, reliable and efficient delivery of natural gas.

(202) 824-7000
400 North Capitol Street, NW, Suite 450
Washington, DC 20001
www.aga.org

American Petroleum Institute

The American Petroleum Institute (API) is the national trade association that represents more than 400 corporate members, from the largest major oil company to the smallest of independents from all segments of the industry. They are producers, refiners, suppliers, pipeline operators and marine transporters, as well as service and supply companies that support all segments of the industry.

(202) 682-7000
1220 L Street, NW
Washington, DC 20005-407
www.api.org

Attorney General, Maine Office of

The Office of Attorney General enforces state antitrust and consumer protection statutes in Maine energy markets and offers mediation services to consumers. The AG he Attorney General has issued rules that regulate the sale of home heating oil during the winter months, from October 15 through April 30.

207-626-8800
6 State House Station
Augusta, ME 04333
www.maine.gov/ag

B

Bangor Gas Company

Bangor Gas Company, L.L.C. serves customers in Bangor, Brewer, Veazie, Orono, and Old Town. Bangor Gas is a wholly-owed subsidiary of Energy West. Bangor Gas obtains its gas supply via the Maritimes and Northeast interstate pipeline. Bangor Gas offers sales service to all classes of customers and transportation-only service to all Commercial and Industrial customers. Bangor Gas has a monthly cost of gas rate and a budget payment plan.
www.bangorgas.com

21 Main Street
Bangor, Maine
(207) 941-9595
info@bangorgas.com

Bangor Hydro Electric Company

Bangor Hydro Electric Company is an electric utility wholly-owned by Emera Inc. Bangor Hydro serves 117,000 customers in an area encompassing 5,275 square miles in eastern and east coastal Maine. Bangor Hydro is a member of the New England Power Pool and is interconnected with other New England utilities to the south and with the New Brunswick Power Corp. to the north.

PO Box 932
Bangor, ME 04402-0932
Local (207) 945-5621
TDD (207) 990-6969
Toll free US / Canada (800) 499-6600
TDD (800) 559-0069
www.bangorhydro.com

C

Central Maine Power

CMP serves more than 600,000 customer accounts in an 11,000 square mile service area in central and southern Maine.

Residential Credit and Collection:
1-800-686-4044
All other Residential Needs:
1-800-750-4000
Commercial / Industrial Accounts:
1-800-565-3181
Outages or Trouble:
Available 24/7
1-800-696-1000
Central Maine Power Company
83 Edison Drive
Augusta, ME 04336
www.cmpco.com

Citgo

Primary petroleum terminal operator - - UL diesel clear.

(207) 799-0319 or (207) 799-2247
102 Mechanic Street
South Portland, ME 04106

Coalition of Northeastern Governors (CONEG)

CONEG is a non-partisan association of the Governors of eight Northeastern states. Members include the Governors of Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island and Vermont. CONEG forges agreements and undertakes cooperative actions on a wide range of regional and state-federal issues including energy.

400 North Capitol Street, NW, Suite 382,
Washington, DC 20001
(202) 624-8450
coneg@sso.org
www.coneg.org

Congress, U.S., Maine Delegation

Office of Senator Olympia J. Snowe
United States Senate
Washington, DC 20510
(202) 224-5344
Toll Free in Maine: (800) 432-1599
www.snowe.senate.gov

Office of Senator Susan M. Collins
413 Dirksen Senate Office Building
Washington, DC 20510
Phone: (202) 224-2523
www.collins.senate.gov

Office of Representative Mike Michaud
1724 Longworth HOB
Washington, DC 20515-1902
Phone: 202-225-6306
http://michaud.house.gov/

Office of Representative Chellie Pingree
1318 Longworth HOB
Washington, D.C. 20515
Phone: (202) 225-6116
http://pingree.house.gov/

Community Action Agencies, Maine

10 Community Action Agencies that provide services to low income people across Maine. The Keep ME Warm Fund is a statewide partnership with the goal of helping Maine people stay safe, warm and secure through public and private contributions, volunteerism and advocacy. The Keep ME Warm fund hopes to raise money to help those who may not be eligible for limited federal, state or local fuel assistance programs.

AROOSTOOK COUNTY ACTION PROGRAM, PRESQUE ISLE
771 Main Street
Presque Isle, ME 04769
(207)764-3721
1-800-432-7881

MMCA, BATH
34 Wing Farm Parkway
Bath, ME 04530
(207) 442-7963

COMMUNITY CONCEPTS, INC., SOUTH PARIS
1-800-866-5588
info@community-concepts.org

KENNEBEC VALLEY COMMUNITY ACTION PROGRAM, WATERVILLE
1-800-542-8227
All programs: 207-859-1500
97 Water Street
Waterville, Maine 04901-6339
info@kvcap.org

PENQUIS COMMUNITY ACTION PROGRAM, BANGOR
PENQUIS
262 Harlow Street
P.O. Box 1162
Bangor, Maine 04402-1162
(207) 973-3500 or
1-800-215-4942
info@penquis.org

PEOPLES REGIONAL OPPORTUNITY PROGRAM, PORTLAND
510 Cumberland Avenue
Portland, Maine 04101
(207) 553-5800

WALDO COUNTY COMMUNITY ACTION PROGRAM, BELFAST
P.O. Box 130, 9 Field Street
Belfast, Maine 04915
(207) 338-6809

WASHINGTON-HANCOCK COMMUNITY AGENCY, MILBRIDGE

P.O. Box 280, Milbridge, ME 04658
Physical Address: Corner of Route 1 and Maple Street
(207) 546-7544
TDD: (207) 546-7607
(207) 546-3216
administration@whcacap.org

WESTERN MAINE COMMUNITY ACTION, INC., EAST WILTON
20 Church St.
Wilton, ME 04294
1-800-645-9396

YORK COUNTY COMMUNITY ACTION CORP., SANFORD
207-324-5762
1-800-965-5762
TTY: 207-490-1078
6 Spruce Street
P.O. Box 72
Sanford, ME 04073

Conservation, Department of

Provides mobile generators and communications equipment for remote facilities that can be used for emergency response.

East Side Campus
18 Elkins Lane, Augusta
(207) 287-2211
Commissioner's Office
1st floor
(207) 287-4900
www.maine.gov/doc

County Emergency Management Agencies

In Maine, emergency management is coordinated regionally by Emergency Management Agencies (EMAs) in each of our 16 Counties. County EMAs provide an invaluable link between the almost 500 cities and towns in Maine, and the State. They provide support and leadership in preparedness, response, recovery and mitigation to their local, business and volunteer partners.

ANDROSCOGGIN UNIFIED EMA
2 College Street
Lewiston, ME 04240
(207) 784-0147

AROOSTOOK COUNTY EMA
158 Sweden Street
Caribou, ME 04736
(207) 493-4328

CUMBERLAND COUNTY EMA
22 High Street
Windham, ME 04062
(207) 892-6785

FRANKLIN COUNTY EMA
140 Main Street
Suite 1
Farmington, ME 04938
(207) 778-5892

HANCOCK COUNTY EMA
County Courthouse
50 State Street, Suite 4
Ellsworth, ME 04605
(207) 667-8126

KENNEBEC COUNTY EMA
125 State Street
Augusta, ME 04330
(207) 623-8407

KNOX COUNTY EMA
62 Union Street
Rockland, ME 04841
(207) 594-5155

LINCOLN COUNTY EMA
P.O. Box 249
Wiscasset, ME 04578
(207) 882-7559

OXFORD COUNTY EMA
County Courthouse
P.O. Box 179
South Paris, ME 04281
(207) 743-6336

PENOBSCOT COUNTY EMA
97 Hammond Street
Bangor, ME 04401
(207) 945-4750

PISCATAQUIS COUNTY EMA
163 Main Street
Dover Foxcroft, Maine 04426
(207) 564-8660

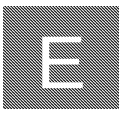
SAGADAHOC COUNTY EMA
County Courthouse
P.O. Box 246
725 High Street
Bath, ME 04530
(207) 443-8210

SOMERSET COUNTY EMA
8 County Drive
Skowhegan, ME 04976
(207) 474-6788

WALDO COUNTY EMA
45A Congress Street
Belfast, ME 04915
(207) 338-3870

WASHINGTON COUNTY EMA
P.O. Box 297
Machias, ME 04654
(207) 255-3931

YORK COUNTY EMA
5 Swetts Bridge Road
Alfred, ME
(207) 324 1578



Efficiency Maine Trust

Efficiency Maine develops and implements energy efficiency and renewable energy programs for businesses and residents. A wide range of programs provide incentives, training

and technical assistance to residents, businesses, contractors, schoolchildren and others.

1-866-376-2463
www.efficiencymaine.com

Energy, U.S. Department of

Office of Electricity Delivery and Energy Reliability
OE is Sector Specific Agency (SSA) oversee all activities associated with the National Infrastructure Protection Plan (NIPP). Maintains close partnership with the electricity and the oil and natural gas sectors.
Energy policy and programs related to business & economic development are addressed by this committee.

U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585
202-586-1411
www.oe.doe.gov/

Infrastructure Security and Energy Restoration

Division of OE that works with Department of Homeland Security, Federal Energy Regulatory Commission, and other national, regional, state, and local government and commercial organizations to support the national critical infrastructure protection program; analyze infrastructure vulnerabilities and recommend preventive measures; help other agencies prepare for and respond to energy emergencies and minimize the consequences of an emergency; conduct emergency energy operations during a declared emergency or national security special event in accordance with the National Response Plan; and develop, implement, and maintain a national energy cyber security program. Energy Assurance Daily provides a summary of public information concerning major energy developments; electricity, petroleum, and natural gas industries; and energy prices.

Energy Information Administration, U.S.

EIA provides a wide range of information and data products covering energy production, stocks, demand, imports, exports, and prices; and prepares analyses and special reports on topics of current interest.

1000 Independence Ave., SW
Washington, DC 20585
(202) 586-8800
www.eia.doe.gov

Environmental Protection, Maine Department of

The Department of Environmental Protection affects energy production, transportation, and use via its various siting and permitting processes, policy development efforts, educational efforts, and voluntary programs. The DEP has authority to approve suspensions or waivers of certain requirements for limited periods of time to relive or avoid an energy shortage. Jurisdiction over emergency spill response.

17 State House Station,
Augusta, Maine 04333-0017
28 Tyson Drive, Augusta, Maine 04333-0017
(207)287-7688
(800)452-1942
www.maine.gov/dep

Executive Department,

Office of the Governor

In addition to its executive policy role, the Governor's office is involved with energy programs and policies through its appointment of cabinet members with energy-related responsibilities and its appointment of representatives to state, regional, and federal working groups on energy issues of significance to Maine. The Governor has authority to proclaim an energy emergency and, in cases of emergency, powers to implement or waive certain programs, standards, priorities and quotas.

Governor Paul R. LePage

1 State House Station
Augusta, ME 04333
207-287-3531
207-287-6548 (TTY)

Governor's Energy Office

The Energy Office serves as the primary energy advisor to the Governor and the Legislature. The Energy Office is the primary architect, author and coordinator of the State of Maine Comprehensive Energy Action Plan and the Maine Energy Emergency Management Plan.

ExxonMobil

Primary petroleum terminal operator – UL diesel clear; gasoline – regular, midgrade and premium.

170 Lincoln Street
South Portland, ME 04106
(207) 767-3251
730 Maine Street
Bangor, ME

F

Federal Emergency Management Agency

The role of FEMA is to build, sustain, and improve U.S. capability to prepare for, protect against, respond to, recover from, and mitigate all hazards, including energy emergencies.

Disaster Assistance
1 (800621-FEMA (3362))
TDD: 1 (800) 462-7585
P.O. Box 10055
Hyattsville, MD 20782-7055
www.fema.gov

Federal Energy Regulatory Commission

FERC is an independent federal agency that regulates the interstate transmission of natural gas, oil, and electricity. FERC also regulates natural gas and hydropower projects.

888 First Street, NE
Washington, DC 20426
Public Inquiries: 1-866-208-3372
customer@ferc.gov
www.ferc.gov

Finance Authority of Maine

To meet the financing needs of Maine's business community, FAME offers a wide array of business assistance programs, ranging from traditional loan insurance programs for both small and larger businesses, to tax credits for investments that individuals make in dynamic, growth-oriented, manufacturing or export-related firms. FAME has also established taxable and tax-exempt bond financing programs that allow strong, creditworthy firms in Maine to access capital at very favorable rates and terms.

5 Community Drive
P.O. Box 949
Augusta, ME 04332-0949
TEL: (207) 623-3263 or 1-800-228-3734
TTY: (207) 626-2717
www.famemaine.com

G

Geographic Information Systems, State of Maine

The MEGIS is responsible for working with the MPUC, MEMA and the Governor's Energy Office on development of the Maine Energy Supply Disruption Tracking Process that integrates existing resources to provide real-time situational awareness with data from multiple sources and jurisdictions. The data (e.g., weather, electric utility outage data, road closure) can be analyzed, mapped, and shared for interagency planning, supply disruption response and recovery.

Christopher Kroot (207) 592-0162
Christopher.kroot@maine.gov
www.maine.gov/megis

Global Petroleum

Primary petroleum terminal – heating oil; kerosene; heavy oil 6 1.75%. Open 24 hours M-F, reduced hours in the summer.

One Clark Road
South Portland, ME 04106
(207) 767-8259

Governor's Energy Office, Maine

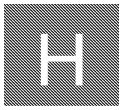
The Governor's Energy Office works with international, federal, state and regional government officials, the Legislature, and private and nonprofit sectors, to create effective public and private partnerships that advance the achievement of energy security, economic development, and environmental health. Its mission includes strategies to strengthen energy efficiency, conservation and weatherization; foster renewable energy; improve transportation and fuel efficiencies; upgrade electricity and natural gas services, transmission systems and infrastructures; State of Maine Leading by Example; and energy emergency preparedness and response. The Energy Office provides fuel supply and monitoring functions; advises the Governor and Legislature on energy emergencies and energy policy; communicates with petroleum terminal operators during an emergency; develops and revises the State of Maine Comprehensive Energy Action Plan and Energy Emergency Management Plan.

Ken Fletcher
22 State House Station
Augusta, ME 04333
Jeffrey Marks (207) 287-8927
Jeffrey.marks@maine.gov
www.maine.gov/oeis

Gulf Oil

Primary petroleum terminal.

175 Front Street
South Portland, ME 04106
(207) 799-5561



Homeland Security, U.S. Department of

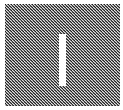
In the event of a terrorist attack, natural disaster or other large-scale emergency, the Department of Homeland Security will provide a coordinated, comprehensive federal response and assume primary responsibility for ensuring that emergency response professionals are prepared for any situation.

Secretary Janet Napolitano
Washington, DC 20528
202-282-8000
www.dhs.gov/index.shtm

Health and Human Services, Department of

Emergency Assistance provides benefits to families with children in some situations when the family is threatened by destitution or homelessness due to an emergency situation. These situations include fire, other natural disasters, termination of utility service, evictions, or lack of adequate shelter. The General Assistance program provides assistance with basic needs for eligible applicants who cannot provide for themselves and their families. Basic needs are defined to include, among others, fuel and utilities. The program is administered at the local level. The Department administers the program for residents of unorganized territories and shares the administration of the program with the municipalities.

221 State Street
Augusta, ME 04333
207-287-3707
TTY: 800-606-0215
www.maine.gov/dhhs



Information and Analysis Center, Maine

As Maine's designated fusion center, it is the mission of the Maine Information and Analysis Center (MIAC) to collect, analyze and appropriately share intelligence between the federal government and the State of Maine. The MIAC also provides analytical and investigative support for crimes of a complex, organized or statewide nature.

877-786-3636 (toll-free throughout New England) / 207-624-7280
TTY: 877-789-0200 (toll-free) / 207-629-5793

www.maine.gov/miac

Irving Oil

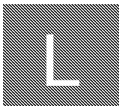
Regional energy processing, transporting, and marketing company headquartered in Saint John, New Brunswick, Canada, with U.S. marketing operations in Portsmouth, New Hampshire. With over 800 fueling locations, operations from eight distribution terminals, and a delivery fleet of tractor-trailers, Irving serves wholesale, commercial, and retail customers in Atlantic Canada, Quebec, and New England.

Irving Oil Terminals, Inc.
190 Commerce Way
Portsmouth, NH 03801
(603) 559-8818
www.irvingoil.com

ISO New England

ISO New England roles include ensuring the day-to-day reliable operation of New England's bulk power generation and transmission system, by overseeing and ensuring the fair administration of the region's wholesale electricity markets, and by managing comprehensive, regional planning processes.

The Customer Services Hot Line (413-540-4220) is staffed Monday through Friday, 7:30 A.M. - 5:30 P.M. ET.
www.iso-ne.com



Legislature, Maine

Bills affecting production, delivery, or use of energy in Maine are generally addressed by the following committees.

Joint Standing Committee on Appropriations & Financial Affairs
This Committee reviews state expenditures including those related to energy activities

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Joint Standing Committee on Labor, Commerce, Research and Economic Development

Energy policy and programs related to business and economic development are addressed by this committee.

Joint Standing Committee on Environmental and Natural Resources
This committee addresses environmental policy that can affect the siting and operations of energy facilities.

Joint Standing Committee on Transportation
Energy issues related to transportation are addressed by this committee.

Joint Standing Committee on Energy, Utilities and technology
Jurisdiction over utilities and energy policy issues in Maine.

Maine House of Representatives
2 State House Station
Augusta, ME 04333
(207) 287-1400

Secretary of the Senate
3rd Floor, Room 327 State House
(207) 287-1540

Office of the Executive Director
115 State House Station
Augusta, Maine 04333-0115
(207) 287-1615

www.maine.gov/legis

M

Maine Emergency Management Agency

MEMA works with state agencies and energy related authorities to ensure that adequate planning and response takes place to address energy emergencies of any kind. Shortage, price spike, and security issues are all considered.

MEMA works closely with County Emergency Management Agencies and through them with municipalities, to address potential energy emergencies as part of a multi-hazard planning approach that looks at all events that could create an emergency situation for Maine. Voluntary agencies, the first line of response in many emergencies, are also partners in the planning process.

If an emergency reaches crisis proportions, and direct response by the state is necessary, MEMA coordinates activation of the State Emergency Operations Center and works with Emergency Response Team members to field the appropriate response to assist Maine citizens.

Lynette Miller (207) 624-4503
Maine Emergency Management Agency
72 State House Station
Augusta, ME 04333
lynette.c.miller@maine.gov

72 State House Station
45 Commerce Dr.
Augusta, Maine 04333
800-452-8735 (toll-free, in-state only)
207-624-4400
TTY: 877-789-0200 (toll-free)/
207-629-5793
www.maine.gov/mema

Maine Energy Marketers Association

450 members including 230 heating oil, propane, motor fuels and convenience store owners who serve more than 415,000 Maine households and service nearly 1 million Maine people. MEMA also has more than 200 associate members who provide goods and services to Maine's petroleum dealers and their customers.

25 Greenwood Road
P.O. Box 249
Brunswick, ME 04011-0249
Toll Free:
888.863.3753
207.729.5298
www.maineenergymarketers.com

Maine Natural Gas

Maine Natural Gas currently serves customers in Windham, Gorham, Bowdoin, Topsham and Brunswick and offers transportation-only service to all commercial and industrial customers and sales service to all classes of customers. Maine Natural Gas has a monthly cost of gas rate and also offers a Fixed Price Option for the cost of gas. Gas leak emergency telephone number: 1-877-532-5636, 1-877-LEAK-ODOR

P.O. Box 99
Brunswick, ME 04011
1-877-867-1642
(207) 729-0420
www.mainenaturalgas.com

Maine Public Service Company

Investor-owned transmission and distribution company in Northern Maine. The Company serves energy to approximately 36,000 customer accounts in a 3,600 square mile area. Major business activities in the area center around agricultural and forest products.
Power Interruptions

(Nights, Weekends & Holidays)
207-760-2300 or 877-655-4448
Customer Service & Account Information
custserv@mainepublicservice.com

Maine Renewable Energy Association

Not-for-profit association of renewable power producers, suppliers of goods and services to those producers, and supporters of the renewable power industry in Maine. MREA members generate electricity in a sustainable manner from wind power, hydro, biomass, tidal, and waste to energy.

PO Box 743
Augusta, Maine 04332
(207) 626-0730
(207) 626-0200
info@renewablemaine.org
www.renewablemaine.org

Maine State Housing Authority

The Maine State Housing Authority offers a variety of energy assistance and energy conservation programs for consumers.
353 Water Street
Augusta Maine 04330
(207) 626-4600
(800) 452-4668
TTY # (800) 452-4603
www.mainehousing.org

Low Income Home Energy Assistance Program (LIHEAP)
The U.S. Department of Health & Human Services Low Income Home Energy Assistance Grant to Maine helps low-income homeowners and renters with their heating costs.

Low Income Assistance Plan (LIAP)
The purpose of this program is to help low-income customers pay their electric bills. The program is funded by Maine's energy transmission and distribution (T&Ds) utilities. Each T&D utility, except those exempted by law, is required to provide this program for its respective region.

Weatherization Program and Central Heating Improvement Program
Provides grants to low-income homeowners and renters to improve home energy efficiency and performs energy-related repairs including insulation, air sealing, central heating and air quality and energy efficiency enhancements

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Appliance Replacement Program
The Appliance Replacement Program is designed to help low-income households reduce their energy costs through replacement of older refrigerators, freezers, and light bulbs that are inefficient and expensive to operate, and through consumer education.

Maine State Police

The Maine State Police has authority to grant transportation waivers regarding border issues, weight limits, route restrictions and other emergency issues.

www.maine.gove/dps/msp

24 Hour Regional communications centers

GRAY (207) 657-3030 or 1-800-228-0857

AUGUSTA (207) 624-7076 or 1-800-452-4664

ORONO (207) 866-2122 or 1-800-432-7381

HOULTON (207) 532-5400 or 1-800-924-2261

CELLULAR CALLS – 911

TDD / TTY line (Statewide) 1-888-524-7900

MAINE STATE POLICE – HEADQUARTERS
42 State House Station
45 Commerce Drive
Augusta, Maine 04333-0042
Phone: (207) 624-7200

Maritimes & Northeast Pipeline (M&NE)

Maritimes is a 685-mile transmission pipeline system built to transport natural gas from developments offshore Nova Scotia to markets in Atlantic Canada and the northeastern United States. The Maritimes system consists of an approximately 30"/24" diameter underground mainline running through Nova Scotia and New Brunswick to the Canadian - U.S. border near Baileyville, Maine. The pipeline continues through Maine and New Hampshire into Massachusetts where it connects with the existing North American pipeline grid at Dracut, Massachusetts. The system has delivery points in Veazie/Bangor, Bucksport, Bowdoin, Lewiston, Westbrook, Gorham, Eliot, Newington & Haverhill.
In the event of an emergency on the Maritimes U.S. facilities, contact:
24-Hour Gas Control/Emergency Response Center toll-free at
1-888-576-4634

Maritimes & Northeast Pipeline, L.L.C.
890 Winter Street
Suite 300
Waltham, MA 02451
617-254-4050
www.mnpp.com

N

National Association of Regulatory Utility Commissioners

NARUC s the national association representing the State Public Service Commissioners who regulate essential utility services, including energy, telecommunications, and water. NARUC members are responsible for assuring reliable utility service at fair, just, and reasonable rates.

1101 Vermont Avenue, NW
Suite 200
Washington, D.C. 20005
202.898.2200
admin@naruc.org
www.naruc.org

National Association of State Energy Officers

NASEO provides direct technical assistance, education and outreach to support states' energy assurance planning, response, and smart grid resiliency efforts. This effort is sponsored and supported by the U.S. Department of Energy's Office of Electricity Delivery and Energy Reliability (OE). Assistance includes: briefing papers, research and analysis on state policies, regional conference calls, webcasts, one-on-one consultations, training opportunities, and energy assurance conferences on a regional and national level.

1414 Prince Street, Suite 200,
Alexandria, VA 22314
703.299.8800
energy@naseo.org
www.naseo.org/energyassurance

North American Electric Reliability Corporation

NERC is the electric reliability organization (ERO) certified by the Federal Energy Regulatory Commission to establish and enforce reliability standards for the bulk-power system. NERC develops and enforces reliability standards; assesses adequacy annually via a 10-year forecast, and summer and winter forecasts; monitors the bulk power system; and educates, trains and certifies industry personnel. Provides energy emergency alerts.

609.452.8060
390 Village Boulevard
Princeton, NJ 08540-5721
Washington Office:
1120 G Street, N.W. : Suite 990 :
Washington, DC 20005-3801
www.nerc.org

Northeast Gas Association

A regional trade association that focuses on education and training, technology research and development, operations, planning, and increasing public awareness of natural gas in the Northeast U.S. NGA represents natural gas distribution companies, transmission companies, liquefied natural gas importers, and associate member companies. These companies provide natural gas to over 10 million customers in eight states (Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island and Vermont).

5 Second Avenue, Suite 510
Needham Heights, MA 02494-2824
781.455.6800
www.northeastgas.org

P

Portland Natural Gas Transmission System (PNGTS)

A high-capacity, high-pressure interstate natural gas pipeline connecting the TransQuebec and Maritimes Pipeline at the Canadian border and the Maritimes and Northeast Pipeline at Westbrook, ME with the Tennessee Gas Pipeline System near Boston, MA.

24-Hour Emergency Line (Gas Control Center): 800-830-9865
Field Operations Line (Non-Emergency): (800) 633-1721
Corporate Headquarters
One Harbour Place, Suite 375
Portsmouth, NH 03801
(603) 559-5500
(603) 427-2807
pngts@transcanada.com
www.transcanada.com

Propane Gas Association of New England

PGANE is a trade association representing nearly 500 members who sell propane or propane related appliances and equipment in the 6 New England States. Membership includes the nation's largest propane companies and many small companies who are often family owned and operated.

P.O. Box 1071, 1024 Suncook Valley Highway, Unit C-5

Epsom, NH 03234-1071
888-445-1075
Joe Rose: Extension 102,
jrose@pgane.org
www.pgane.org

Public Advocate, Office of Maine

The Public Advocate advocates for the interests of ratepayers of electric and gas utilities before the Maine Public Utilities Commission and in regional and national forums where utility policy is debated and adopted. The Office also works closely with citizens groups on utility-related concerns.

207-287-2445
103 Water Street, 3rd Floor
Hallowell, ME 04347
www.maine.gov/meopa

Public Utilities Commission, Maine

The MPUC currently regulates approximately 430 electric, telephone, water, and gas utility companies and districts. For these companies, the Commission establishes rates, grants utility operating authority, regulates utility service standards and monitors utility operations for safety and reliability. The Commission responds to customer questions and complaints and provides information to the public and policy-makers. The Commission's Consumer Assistance Division (CAD) is charged with ensuring that consumers and utilities receive fair and equitable service through Commission education and consumer complaint resolution programs. As part of this mission, the CAD is responsible for responding to information requests, resolving consumer complaints, assessing utility compliance with consumer-related statutes and Commission rules, and screening requests from utilities seeking to disconnect gas or electric service in the winter.

101 Second St.
Hallowell, ME 04347
Augusta, ME 04333-0018
(207) 287-3831
TTY Relay: 1(800) 437-1220
Consumer Assistance Hotline: 1 (800) 452-4699
maine.puc@maine.gov
www.maine.gov/mpuc
(207) 287-5945
For a list of all licensed retails electricity suppliers, visit http://www.maine.gov/mpuc/electricity/list_of_suppliers.shtml.

Sprague Energy

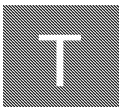
Sprague is one of the largest suppliers of energy and materials handling services in New England with products including: home heating oil, diesel fuels, residual fuels, gasoline and natural gas.
www.spragueenergy.com

South Portland Terminal
59 Main Street
South Portland, ME 04106
207-799-4899

Bucksport Terminal
Route 15 River Road
Bucksport, ME 04416
207-548-2531

Searsport Terminal
Mack Point - Trundy Road
Searsport, ME 04974
207-548-2531

Merrill's Marine Terminal
92 Cassidy Point Drive
Portland, Maine 04102
207-772-3254



Transportation, Maine Department of

The MaineDOT has primary responsibility for statewide transportation by all modes of travel.

Child Street
16 State House Station
Augusta, ME 04333-0016
(207) 624-3000
TTY: 1-888-516-9364
www.maine.gov/mdot

2-1-1 Maine

2-1-1 Maine is a comprehensive statewide directory of over 8,000 health and human services available in Maine. The toll free 2-1-1 hotline connects callers to trained call specialists who can help 24 hours a day, 7 days a week. Finding the answers to health and human services questions and locating resources is as quick and easy as dialing 2-1-1 or visiting www.211maine.org.
Dial: 2-1-1
TTY: 2-1-1
From a rotary phone dial: 1-866-811-695
Toll free in-state or out of state dial: 1-877-463-6207
Email: info@211maine.org
For resource directory questions and comments:
Dial: 207-221-8150
Email: resources@211maine.org
Mailing address:
2-1-1 Maine
50 Lydia Lane
South Portland, ME 04106

U

Unitil

Unitil provides natural gas service to approximately 25,000 customers in Greater Portland, Lewiston/Auburn and Kittery. Unitil is headquartered in Hampton, New Hampshire. Unitil's rates are composed of two components – its delivery (or transportation) rates, its gas supply rates. The latter is subject to change every six months.

Gas leaks and other gas-related emergencies should be reported immediately. To report a gas leak or related emergency, call 24 hours a day, 7 days a week toll-free 866-900-4460.

www.unitil.com

W

Webber Energy Fuels

Provides residential heating oil, propane and biofuels.

700 Main St.
Bangor, ME 04401
800-238-5505
(207) 942-5505
www.webberenergy.com

Appendix W: Consumer Home Heating Rights

Last Revised 10/16/08

19

CONSUMER HOME HEATING RIGHTS

§ 19. 1. Introduction

During the winter months home heating fuel is a necessity to Maine consumers. In Maine, sellers of home heating oil, LP gas, natural gas, electricity and firewood are held to higher legal standards than most merchants. These standards include:

A. Home Heating Oil

The Attorney General has issued Rules under the Maine Unfair Trade Practices Act[1] that regulate, from October 15 through April 30, the sale of home heating oil. These Rules give consumers the right to purchase home heating oil even if that consumer owes the dealer money.

B. LP Gas (Propane)

Pursuant to the Maine Unfair Trade Practices Act, consumers have the right to purchase home heating LP gas even if that consumer owes the dealer money.

C. Firewood

There are specific statutory protections[2] for purchasers of firewood. These statutes define a "cord" and require that firewood dealers provide consumers with a receipt.

D. Natural Gas & Electricity

The Maine Public Utilities Commission has issued Rules for utilities that provide natural gas or electricity. These Rules protect consumers and regulate service and prices.

Failure to follow these laws and regulations may be an unfair trade practice, in violation of 5 M.R.S.A. § 207. Intentional violations of the Unfair Trade Practices Act can result in a civil penalty of up to $10,000. Consumers can bring private unfair trade practice action[3] and receive damages or any lost money and their lawyer's fees.

This consumer rights chapter has the following sections:

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[1] 5 M.R.S.A. §207(2).
[2] 10 M.R.S.A. § 2302(1), § 2624 and § 2628.
[3] 5 M.R.S.A. § 213.

§ 19. 2. Your Rights Under The Attorney General Home Heating Oil Rules

Pursuant to the Maine Unfair Trade Practices Act,[4] the Attorney General has issued Rules that regulate, *from October 15 through April 30*, the sale of home heating oil. These Rules are listed in §19.9. The following is an explanation of your rights pursuant to these Rules.

A. Delivery Rights If You Owe the Dealer Money

An oil dealer cannot refuse to deliver to you even if you owe the dealer money, provided these three conditions are met:

(1) You have cash or government guaranteed payment to pay for the oil you are requesting;

(2) The dealer regularly serves your area; and

(3) You request at least 20 gallons.

This does not mean that the dealer must drop everything and make an emergency delivery if you call. It does mean that, at the latest, a dealer must deliver oil to you on the next scheduled trip to your area. However, if you order less than 50% of your tank's storage capacity, or 100 gallons, whichever is less, the dealer can impose a delivery surcharge of up to $20.00. For example, if you have the standard 275-gallon tank you must order at least 100 gallons to avoid a surcharge. Since one-half of a 275-gallon tank is 137.5 gallons, 100 gallons is sufficient in this case.

If the dealer agrees to make an *unscheduled delivery*, the dealer has the right to charge you its extra costs. Before this charge is imposed, the dealer must tell you:

(1) Approximately how much the extra charge will be;

(2) The reason for the extra charge; and

(3) When the dealer will make the next regularly scheduled delivery to your area.

The dealer's surcharge cannot exceed the actual cost incurred by making an unscheduled delivery. If you call for immediate delivery on a day the dealer plans to be in your area anyway, the dealer cannot charge you for an unscheduled delivery.

If you are requesting an unscheduled delivery, then the dealer can impose a minimum delivery requirement (e.g., more than 20 gallons). However, if you are an "established customer" (see below) and the dealer regularly provides emergency services or unscheduled deliveries to other established customers without imposing a surcharge or a minimum delivery requirement, then the dealer must do the same for you.

If you require an unscheduled delivery of less than the minimum delivery amount, you may be

[4] 5 M.R.S.A. § 207(2).

charged both a penalty and a surcharge. No other extra charges are permitted.

B. Established Customers

You can become an established customer of any oil dealer serving your area by making your *next two* oil purchases from that dealer. Once you have become an established customer, the dealer must give you the same service and prices given other established customers. For example, if the dealer offers established customers immediate service in an emergency, without a minimum delivery requirement, the dealer must offer you the same.

Moreover, a dealer cannot charge you a price different from what other established customers are charged unless the dealer has a good reason. In addition, the dealer may not have different credit policies for similar customers without good reason. For example, you cannot be denied credit just because you receive money from a public assistance program. You could be denied credit, however, because your monthly public assistance income is less than the amount the dealer requires of all credit customers.

C. Credit Denial

If your credit application is denied, the dealer must:

(1) Inform you within four business days or within two days of receiving a Credit Bureau report; and

(2) Tell you why, in writing, if you ask.

If your credit is terminated or altered, the dealer must:

(1) Give you 5 days' notice before the change; and

(2) Explain why, in writing, if you ask him.

If you need oil during this 5-day notice period and want to buy it on credit, the dealer has to sell you only enough oil on credit to last you through the remainder of the 5-day period. Even if you lose your credit, you can still be a cash customer.

If the dealer quotes you an oil price, that is the price at which the oil must be delivered, *unless* the dealer specifically tells you the price is subject to change. In that case, you will be charged according to the dealer's price on the day the oil is actually delivered to you.[5]

D. Heating Oil Orders

You are guaranteed the price quoted by the dealer unless the dealer specifically communicates to you that the quoted price is subject to change and that the price the person will pay is the dealer's price on the day the oil is actually delivered.

§ 19. 3 Guaranteed Price Contracts

Home heating dealers (oil, kerosene, propane) are increasingly offering prepaid guaranteed price plans. In 2005 the Maine Legislature prohibited any dealer from offering you such contracts unless it first obtained financial protection that would ensure the dealer's ability to deliver the product for the agreed price. Dealers must now obtain one of the following protections:

A. Contracts with suppliers that guarantee the dealer will be able to purchase at a fixed price an amount equal to 75% of the maximum gallons the dealer is committed to delivering to its prepaid customers;

---

[5] *See New Hampshire v. J.C. Oliver Enterprises, Inc.*, 00-E-0004 (Belknap Superior Court, August 4, 2000 (Perkins, J.)).

B. A surety bond equal to at least 50% of the total amount paid by its prepaid customers; or
C. A letter of credit equal to 100% of the total amount paid by its prepaid customers.

Further, each customer's prepaid contract must specifically indicate:

A. The total money paid by the customer under the contract;
B. The maximum number of gallons committed by the dealer for delivery; and
C. That the contract is secured by one of the three consumer protections listed above (guarantee contracts with suppliers, a surety bond or letters of credit).

So if you enter into a heating prepaid contract, make sure the dealer has confirmed in the contract that he has obtained one of the three required protections. If the contract does not state you are protected, call the Attorney General's Consumer Protection Division (800-436-2131).

Finally, the prepaid contract must have a reimbursement provision that any unused money will be refunded to you within 30 days, unless the parties have agreed to a different reimbursement procedure. If you agree to a liquidated damages clause (money you would owe if you breach the contract), make sure it is limited to the dealer's actual damages. For example, the dealer should not suffer any damages if the market price of heating oil at the time of the breach is higher than the price of the guaranteed price plan.

§ 19. 4. Help With Your Fuel Bills

Many oil dealers offer payment plans. This may be a convenient and affordable way to spread your winter oil bills over the year. Be sure to compare prices offered by different dealers and read all the details of any budget plan.

The Federal Fuel Assistance Program administered by the Maine State Housing Authority provides states with fuel assistance money to distribute to residents who need help with fuel bills. Eligibility is determined by the program's income guidelines. To find out if you qualify or to apply for assistance, call your nearest Community Action Agency (*see* Chapter 30, Consumer Assistance Resources) or the Maine State Housing Authority (toll free 1-800-452-4668). In an emergency, call 211 or your town or city, local church and civic groups may also be able to help.

A. Heating Oil Buyer's Tips

(1) Watch the fuel level on your tank and call a reasonable time in advance to request delivery. Avoid costly emergency deliveries.

(2) Compare prices. When you get a price quote from an oil dealer, ask whether the price quoted "today" will still be the price you pay when your oil is delivered.

(3) Labor is expensive! Before calling your oil dealer for service, check the following things:

(4) Check your thermostat setting. Make sure it's not clogged with dust! (If you have a clock thermostat, make sure it's set correctly.)

(5) Make sure all electrical switches are "ON."

Press the reset button on your furnace. This button, it's usually red, may be on your burner control box on the chimney or on the burner itself.

CAUTION: If you push the reset button and the furnace runs only a minute or so, DO NOT RESET IT AGAIN. Call your oil dealer.

(6) Check your fuse box or electrical panel for blown fuses or tripped circuit breakers.

(7) Check the boiler water level if you have a steam heat system. If the water on the boiler gauge glass is low, open the water feed line valve until the correct level is reached. Close the water valve tightly.

(8) Don't let your furnace run dry. This could cause damage to your furnace that would be expensive to repair.

§ 19. 5. LP Gas (Propane)

The Attorney General's Home Heating Oil Rules set forth unfair trade practice principles that also apply to Maine dealers who deliver LP gas for heating.

A. Delivery Rights If You Owe the Dealer Money

The Attorney General considers it an unfair trade practice to refuse to supply LP gas or any other heating fuel during the winter months to cash customers. This rule applies even if the customer owes the dealer money. If the customer has cash to prepay or has made payment arrangements through the Home Energy Assistance Program (HEAP), the dealer must deliver.

This requirement to sell to cash customers applies when the propane is being sold for consumption in a properly installed, approved LP gas heating appliance which is used *as the primary source* to heat the interior of a building which is the person's principal residence.

A variation on this refusal to deliver fuel occurs when a dealer refuses to make a *small delivery*. If a dealer establishes an unreasonably high minimum delivery requirement, the dealer is also in violation of the Maine Unfair Trade Practices Act. A reasonable approach for dealers would be to establish as a minimum, the smallest amount of product that will supply the total connected BTU load under existing climatic conditions. As a guideline for a minimum delivery requirement, we would suggest whatever is the larger of the following amounts:

(1) 50 gallons; or

(2) 50% of the total ASME system or 50% of the ICC/DOT equipment installation.

The principle that cash customers must be served does not mean, however, that a dealer must make a free, unscheduled delivery. The dealer should deliver on the next regularly scheduled route. If it is a "run-out" situation, due to something other than the dealer's fault, a special delivery charge that reflects the additional costs may be collected.

B. Discrimination Among Consumers

LP gas dealers must also be cautious not to discriminate. The dealer may not discriminate unfairly among customers with respect to any of the following services:

(1) Sales of LP gas or LP gas prices;

(2) Minimum charges for special deliveries;

(3) Minimum deliveries; and

(4) Equipment installation and service.

C. Fair Credit Practices

A dealer must adhere to the prohibitions against discrimination in the Federal Equal Credit Opportunity Law. For example, it is unlawful for any creditor to discriminate on the basis of race, color, religion, national origin, ancestry, sex, marital status, or age or because all or part of the

applicant's income derives from any public assistance program.

The right to purchase heating fuel on credit is crucial during the winter months. The dealer should notify his customers promptly when credit is being denied or suspended. He should be ready to give to each customer his reasons for denial or suspension in writing. When suspending credit, he must be certain to give them reasonable, advance notice so that they can make other arrangements.

These unfair trade practice standards apply during the winter months (October 15 to April 30). If they are violated without good reason, both the Attorney General and the injured consumer can bring legal actions.

D. LP Gas Buyer's Tips

If you get a quote from a dealer for the price of LP gas "today," then that is the price you should pay. The exception to this is if the dealer *specifically* tells you that the price is subject to change and it will depend on the dealer's price on the day of delivery.

§ 19. 6. Firewood

Firewood is a substantial supplier of our energy needs. Mainers burn nearly one million cords of wood each year. A lot of people are buying wood, a lot of people are selling it, and a lot of buyers are filing complaints about those sales.

Maine law prohibits the use of confusing terms in the sale of firewood such as "rack," "pile" and "truckload" since such terms are undefined and subject to various meanings. Maine law does provide two definitions of a *cord*; one for a stacked cord, the other for a loose thrown cord.

A. Stacked Cord

A **stacked or standard cord**[6] is a measure of **wood, bark and air**: 4 feet wide, 4 feet high and 8 feet long, or its equivalent, containing 128 cubic feet when the wood is ranked and well stowed. "Ranked and well stowed" means that pieces of wood are placed in a row, with individual pieces touching and parallel to each other, and stacked in a compact manner. Any voids that will accommodate a stick, log or bolt of average dimensions to those in that pile must be deducted from the measured volume.

B. Loose Thrown Cord

Maine law also defines a **loose thrown cord**[7] as: "Fuel wood, when sold loose and not ranked and well stowed, shall be sold by the cubic foot or loose cord, unless other arrangements are made between the buyer and seller. When sold by the loose cord, the wood in any cord shall average either 12 inches, 16 inches, or 24 inches in length. When so sold, the volume of the cord shall be: a cord of wood 12 to 16 inches in length shall mean the amount of wood, bark and air contained in a space of 180 cubic feet; and a cord of wood 24 inches in length shall mean the amount of wood, bark and air contained in a space of 195 cubic feet."

Firewood dealers usually deliver loose thrown cords. The volume of a loose thrown cord can best be measured in a container, i.e., a truck. Once a loose thrown cord is stacked it should measure somewhere between 115 and 124 cubic feet per cord.

C. Written Receipts

Maine law requires firewood dealers to give you a receipt[8] for any sale of more than $20. The

[6] 10 M.R.S.A. §2302(1)(A).
[7] 10 M.R.S.A. § 2302(1)(A-2).
[8] 10 M.R.S.A §2624.

receipt must include:

(1) Buyer's and seller's names and addresses;

(2) Date delivered;

(3) Quantity of wood delivered (and quantity upon which the price is determined if different from the amount delivered);

(4) Price (please note: sellers cannot misrepresent the price of the wood nor represent the price in any way that would mislead the buyer);[9]

(5) Description of wood (*e.g.*, 50% red oak, rest mixed hardwood); and

(6) Statement of quality (*e.g.*, dry or seasoned).

Insist upon a receipt. In case a dispute arises, it may be valuable evidence of what the dealer promised to deliver.

D. Wood Buyer's Tips

Shop for wood as you would for any product. Compare prices, type and quality of wood offered, its seasoning, and delivery date.

Try to get your wood as far ahead of when you expect to use it as possible. Ideally, wood should be seasoned at least one year before burning. To allow for maximum drying, stack your wood so that plenty of air circulates through and around it. Cover the wood loosely, but don't let the cover hang over the sides and block air circulation. As a practical matter, firewood to be properly seasoned should dry for at least a full three summer months, and even then wood at the bottom of the stack could still be green. The Forest Service reports that it is a common consumer fraud to claim firewood is seasoned, even though the wood has more than 25% moisture content.

Before paying top dollar for wood from conventional wood dealers, consider some less expensive sources:

(1) Saw mill and lumberyard scraps may be available free or at a nominal price.

(2) Portions of state and national parks are sometimes open to the public to clear deadwood and diseased trees. Check with the park ranger before collecting this wood.

(3) If you think your wood dealer has not provided you with the correct amount of wood, or misrepresented the wood as "seasoned," you can request assistance in measuring your cord from the Bureau of Weights and Measures, Department of Agriculture, 287-3841. Be sure to have a receipt from the dealer stating how much wood was sold to you. If you've been shorted, the Bureau will help you get your money back.

§ 19. 7. Natural Gas And Electricity

The Maine Public Utilities Commission (PUC) regulates utilities that provide electricity or natural gas. The PUC's job is to protect the rights of all rate payers and to ensure that utilities provide adequate service at fair prices.

A. Payments

Pay your bill as soon as you can. If you pay after the "due date" on the bill (at least 25 days), you

[9] 10 M.R.S.A. § 2622.

may be charged a late fee. If you pay by mail, your bill is considered paid on the day the company receives your payment. If you pay in person, your bill is considered paid on the day you pay it.

B. Payment Plans

If you can't pay your bill in full, ask the utility for a payment plan. This payment plan must consider your ability to pay and your previous payment history. Most plans require you to pay weekly or monthly installment payments plus future bills within 30 days of the postmark. If you break a payment plan the utility can send you a 3-day disconnect notice which requires you to pay your overdue amount in full. Utilities may renegotiate a plan if you have a good reason for wanting the plan changed.

C. Low Income Help

Electric and natural gas companies must offer low-income customers special payment plans to spread out payment of winter bills. These special payment plans may allow low income customers to pay less than their current month's bill during the winter; those customers then pay the outstanding portion of their winter bills during the summer by the following November 1st.

Low-income customers may be able to get help paying their bills. Utilities should refer you to the right agency in your community. *See* Chapter 30 in this Guide, § 30.2, "Community Action Agencies" and "Emergency Help."

Telephone companies might offer special reductions of your monthly bill if you qualify for one or more of these programs: Food Stamps, Medicaid, AFDC, TANF, Supplemental Social Security (SSI or gold check) or Fuel Assistance (HEAP).

D. Disconnection

The utility may disconnect your service if you fail to pay a deposit or a bill, fail to keep a written payment plan, tamper with your meter, or somehow obtain service without paying for it.

The company will usually give you a 14-day disconnection notice, but it may give you as little as 3 days notice in certain cases. No notice will be given if the disconnection is because of a dangerous condition or the customer has stolen service. Disconnection cannot happen on a Friday, a weekend, a legal holiday, the day before a holiday, or any day the office is closed.

In the past, utilities needed PUC approval before disconnecting customers in the winter months (November 15 through April 15). Beginning in 1990, however, two Maine utilities (Bangor Hydro-Electric and Maine Public Service) were allowed to disconnect customers in some circumstances *without* PUC approval during the winter months. These procedures were enacted in order to stimulate the receipt of financial assistance before unpaid electric bills get too high. No customer can be disconnected *if* the customer enters into a long-term payment plan and *if* the customer complies with the long-term payment plan.

E. Medical Emergencies

Even if you have an overdue bill, you have a right to service if you or a member of your household is seriously ill. Ask your doctor to call the utility or call yourself if you can't get a doctor right away. The utility may require a letter from your doctor. The utility will not disconnect for up to 30 days, with renewal up to 90 days. But you still have to pay the bill.

F. Landlord/Tenant

A utility cannot automatically disconnect tenants at the request of the landlord or if the landlord fails to pay a bill in the landlord's name. The utility must first give tenants an opportunity to assume

responsibility for future service. The utility cannot require tenants to pay the landlord's overdue bill.[10]

G. Disconnect When Service Provided by Landlord

In cases where the landlord assumes responsibility for utilities, a disconnect cannot occur until the utilities company notifies the tenant and allows the tenant the opportunity to assume responsibility for future service. Tenants cannot be forced to pay utility charges which are the landlord's responsibility. Any tenant assuming responsibility for future service, and paying the utility, may deduct the amount paid from any amount due the landlord.[11]

If the landlord agrees to provide heat for the residence, Maine law requires that:

(1) The landlord maintains an indoor temperature which is not so low as to be injurious to the health of occupants not suffering from abnormal medical conditions;

(2) The residence's heating facilities must be capable of maintaining a minimum temperature of at least 68 degrees Fahrenheit at a distance of 3 feet from the exterior walls, 5 feet above floor level at an outside temperature of minus 20 degrees Fahrenheit; and

(3) The heating facilities are operated so as to protect the building equipment and systems from freezing.[12]

H. Consumer Complaints

The Consumer Assistance Division (CAD) of the Maine Public Utilities Commission has specially trained staff to assist customers in resolving their complaints with utilities. The Commission analyzes customer complaints and uses them as signals to determine where problems may exist and whether utilities are following State laws and the Commission's rules.

Before you contact the CAD for assistance you must contact the utility and give the utility a chance to resolve the problem. Call the utility at the telephone number listed on the bill or disconnection notice. The utility is required by law to work with you to try to resolve the problem. If necessary ask to speak with a manager or supervisor.

The utility should investigate your complaint and contact you regarding the results of their investigation within a reasonable time. The utility should try in good faith to settle your dispute. For example, if you cannot pay your bill in full, the utility should give you a chance to make an installment payment arrangement.

If the utility response does not satisfy you, call or write the CAD. The PUC will ask the utility for a copy of its record on your complaint and review it. The PUC will halt disconnection while this review takes place, but you must call or write it before the disconnection date stated on your disconnection notice.

Consumer Assistance Division
Maine Public Utilities Commission
242 State Street
18 State House Station
Augusta, Maine 04333-0018
Tel: 207-287-3831 or 1-800-452-4699

The Consumer Assistance Division receives a large number of calls so you may not be able to get through right away, but keep trying. You may also hear a taped message when you call asking that you

[10] 14 M.R.S.A. § 6024-A, 35-A M.R.S.A. §§ 704-706.
[11] 14 M.R.S.A. § 6024-A; 35-A M.R.S.A. §§ 704-706.
[12] 14 M.R.S.A. § 6021(6).

leave your name and phone number. Please do as the tape instructs you and CAD will get back to you as soon as possible.

I. Consumer Rights While Complaint Is Pending

A utility cannot disconnect your service while a complaint is being investigated. However, if you have a complaint concerning part of your bill, you are responsible for paying that portion of your bill which is not in dispute. If you do not pay or make an arrangement on the undisputed amounts, the utility may continue to collect or even disconnect your service once it has given proper notice.

§ 19. 8. Coal

A. Written Receipts

The same law that requires dealers to give you a receipt for bulk delivery of wood also applies to bulk delivery of coal. Whenever the dealer delivers coal in an unpackaged form in which the dealer determines and represents the quantity, the dealer must give you a written receipt stating: Both your name, the dealer's name and address, the date delivered, the quantity delivered, the price and a description of the type of coal sold. Because the quality of coal is so important to the successful operation of your stove, shop for your supply carefully.

B. Coal Buyer's Tips

(1) Buy from established, reputable dealers.
(2) Ask about the ash content of the coal: 8-12% is acceptable, over 12% is not. Avoid it. Lower ash content means better combustion.
(3) Buy a small amount of coal (200 pounds or so) and try it. If it's good, order more.
(4) Buy early.

§ 19. 9. Conservation Tips

Finally, always remember that one solution to high fuel prices is an even greater vigilance to home conservation. Here is some advice on saving:

A. Room thermostats should be set at 65 degrees during the day and 55 degrees at night. If someone in your home is sick or elderly, setting the thermostat that low might not be advisable.
B. Conserve hot water, insulate the tank and set the thermostat at 110 degrees.
C. Wash clothes in cold water.
D. Turn off the heat in rooms you are not using and close the doors of those rooms.
E. Drapes and window shades help. At night and on cold windy days, keep the shades pulled and drapes closed to help keep heat in.
F. Weatherstrip and caulk all leaks around doors and windows.
G. Keep radiators clean and keep furniture away from the radiators.
H. Have your heating system checked for operating efficiency. Try for 60-70%.
I. Block off unused fireplaces.

§ 19. 10. Attorney General Home Heating

Rules

The Attorney General has issued Rules describing unfair trade practices in the sale of residential heating oil by retail dealers. *These Rules are in effect from October 15 through April 30 of each year.* Failure to follow these Rules is *prima facie* evidence of an unfair trade practice, in violation of 5 M.R.S.A. § 207. *See* Chapter 3, Unfair Trade Practices.

A. Attorney General Home Heating Rules

§ 100.1 Definitions

1. "Dealer" includes all retail oil dealers who sell home heating oil for use and not for resale.

2. "Established delivery area" means the geographic area bounded by a retail dealer's delivery routes used to service established customers.

3. "Heating oil" means number 2 oil or kerosene, sold to heat the interior of a building used as a person's principal place of residence.

4. "Market price of heating oil" means the highest price per gallon of heating oil a dealer customarily charges his buyers in an established delivery area.

5. "Unscheduled delivery" means a delivery which causes the dealer to dispatch a truck along a delivery route he would not have otherwise taken during the day's regular working hours.

Comment

A common example of a dealer's market price for heating oil would be that charged a person on thirty days credit for automatic delivery to a 275-gallon tank.

For further explanation of an unscheduled delivery, see the Comment to RULE 100.6.

§ 100.2 Violations

A violation of any of the following Rules is [*prima facie* evidence of] an unfair trade practice.[13]

Comment

These rules set forth examples of acts by dealers which constitute illegal practices under the Maine Unfair Trade Practices Act. Other acts which place an unlawful burden on consumers are also prohibited under the Maine Unfair Trade Practices Act even though they are not specifically included in these rules.

These rules do not relieve dealers of any obligations or duties imposed by other laws.

§ 100.3 All Established Customers Receive Dealer's Offered Services

The dealer may not discriminate unfairly among his established customers in the following areas:

A. Heating oil sales, including requests for immediate service, or additional charges for deliveries of oil below the minimum delivery requirement of unscheduled deliveries; and

B. Oil burner installation and service.

For the purpose of this Rule, an "established customer" of a dealer includes any person whose last two heating oil purchases were made from the dealer.

[13] Violation of Unfair Trade Practice Rule is *prima facie* (presumptive) evidence of a violation of 5 M.R.S.A. § 207.

Comment

This Rule sets out the principle that all established customers are entitled to equal service. For example, a person can insure emergency service or repair to his oil burner by becoming an established customer of a dealer who provides these services to his customers.

This Rule does allow the dealer to adopt such practices as surcharging for unscheduled deliveries if it is the established buyer's fault the tank went dry, but not surcharging if it is the dealer's fault.

Since 100.4 requires service for any cash customer, any person can become an "established customer" by making two cash purchases in a row from the same dealer.

§ 100.4 Required Heating Oil Sales

A dealer must sell heating oil within its established delivery area to any person who is willing and able to pay cash. The dealer must make this sale even if:

A. The person has not paid for a past sale of heating oil; or

B. The person is not an established customer of the dealer.

This Rule also applies if payment is to be made in certified or cashier's check, commercial money order, or their equivalent, or if a government or community action agency has guaranteed to pay on behalf of the person the cost of the heating oil sale.

When a person requests 20 gallons or more of heating oil under this Rule, the dealer must deliver the oil no later than the next scheduled delivery to the person's neighborhood.

Comment

This Rule ensures that any person ready and able to pay can receive a heating oil delivery. Further, by making two cash purchases under this Rule, any person can become an established customer of the dealer of his choice and thereby become eligible for all services that dealer provides to established customers.

§ 100.5 Minimum Delivery Requirement

A dealer is required to make scheduled deliveries of 20 gallons or more. However, for any delivery below the following amount:

A. 50% of the customer's tank; or

B. 100 gallons, whichever is less, the dealer may charge a surcharge not to exceed $20.[14] No other penalty is permitted.

§ 100.6 Surcharge Permitted for Unscheduled Delivery

When the dealer makes an unscheduled delivery at the request of a buyer, he may add a separate charge to his price. This surcharge may not exceed the actual additional costs incurred. No

[14] This surcharge was increased from $5 to $20 pursuant to an Emergency Rule (10/16/08).

other surcharge is permitted.

Prior to accepting an order for an unscheduled delivery, the dealer shall inform the buyer of the approximate amount of the surcharge, the reason for the surcharge, and when his next scheduled delivery will take place.

Comment

Under this Rule dealers must establish uniform surcharges for unscheduled deliveries. In doing so the dealer may consider such factors as extra miles traveled or overtime pay.

Examples of unscheduled deliveries include:

A. When the dealer must dispatch a truck to serve a person on a day during which he would not otherwise be in that area; or

B. When a dealer must dispatch a truck to return to an area he has already served that day.

It is *not* an unscheduled delivery when a person requests a delivery for a day on which the truck is already scheduled to be in his area.

A dealer may establish a flat rate surcharge for buyers that does not exceed his average additional costs.

§ 100.7 Price Discrimination Prohibited

A dealer may not discriminate by charging some persons a price higher than his current market price of heating oil. Except for a penalty for a delivery below the minimum delivery requirement or a surcharge for an unscheduled delivery, no other penalties or surcharges are permitted.

§ 100.8 Credit Discrimination Prohibited

A dealer must adhere to the prohibitions against discrimination in the Federal Equal Credit Opportunity Law, which is found at Title 15, 1691(a) through (c) of the United States Code Annotated and the State's Fair Credit Extension Act, which is found at Title 5, Maine Revised Statutes Annotated, §§ 4595 through 4598.

Comment

These federal and state laws detail unlawful credit discrimination. For example, it is unlawful for any creditor to discriminate on the basis of race, color, religion, national origin, ancestry, sex, marital status or age, or because all or part of the applicant's income derives from any public assistance program.

§ 100.9 Notice of Credit Rejection or Change of Terms Required

If credit is denied, the dealer must so inform the credit applicant in writing. This notice must be given within 4 business days or if a dealer uses a credit bureau, within 2 days of receiving the bureau's report. Notice shall state the reasons for denial or inform the applicant of his right to request such reasons.

If the applicant requests the reasons credit was denied, the dealer must respond within 2 business days. The dealer's response must be in writing if the applicant so requests.

A dealer must give 5 days advance notice of termination or alteration of credit terms and the

reasons why.

If a person demands a credit oil delivery within the 5-day notice of termination period, the dealer need not sell him more oil than he needs to last through the notice period.

§ 100.10 Reasonable Exceptions to These Rules

In adhering to these Rules, a dealer may make reasonable exceptions favorable to classes of people with relatively low income, such as the elderly, recipients of public assistance, or other persons on a fixed income.

§ 100.11 Suspension Dates

These Rules will be in effect each year from October 15 through April 30.

§ 100.12 Heating Oil Orders

When a dealer quotes to a person a specific heating oil price and the person places an order, the dealer must deliver the oil at that price unless the dealer has specifically stated to the person that:

A. The price per gallon is determined on the day the oil is actually delivered; and

B. The price quoted on delivery day may be higher or lower than the quoted price.

Comment

This Rule insures that a person who orders oil is charged at the price quoted by the dealer unless the dealer specifically communicates to that person that the quoted price is subject to change and that the price the person will pay is the dealer's price on the day the oil is actually delivered.

B. Basis Statement

The rapid and continuing escalation of the price of heating oil, together with the increased possibility of at least temporary shortages, have created market conditions in which certain business practices place an unfair burden on many persons. Specifically:

1. Since 1976 the cost of home heating fuel has nearly doubled while the real income of persons on fixed incomes — the elderly, the poor, the disabled — has actually declined.

2. Over ninety percent of Maine homes heat with oil. Heating oil is a necessity and there is a limit to which consumers can respond to higher prices by greater conservation.

3. Many customers currently have outstanding heating oil bills and may be faced with dealers unwilling to serve them or credit terms so stringent they cannot be met.

4. Credit arrangements for home heating oil will be crucial this winter. The National Advisory on Economics reported recently that the households in the lowest 10 percent of income distribution spend more than 119 percent of after tax income on necessities. The only solution this winter for these households if they are to have necessities — food, energy, housing, medical care — is to borrow.

5. Many consumers this winter will be unable to make the large purchases that are most efficient for oil dealers and for which dealers therefore can charge less. Thus, the person who has little money or who cannot afford to convert to a larger tank may be forced to pay even more for heat.

These Rules recognize the oil dealer's need for efficient practices while also ensuring that unrestricted market forces do not unfairly prevent customers from meeting their minimal heating

needs.

C. Authority

The statutory authority under which the Attorney General promulgates these Emergency Rules is Title 5, Maine Revised Statutes Annotated, § 207 of Maine's Unfair Trade Practices Act and Title 10, Maine Revised Statutes Annotated, § 1105, which prohibits profiteering or unreasonable discrimination in such necessities as fuel oil. Specifically, § 207, sub-§ 2 of the Unfair Trade Practices Act permits the Attorney General to make rules defining unfair trade practices.

Maine's Unfair Trade Practices Act prohibits "unfair or deceptive acts or practices in the conduct of any trade or commerce." This phrase is the same as that contained in the Federal Trade Commission Act, 15 United States Code, § 45, and our Maine statute states that Maine courts will be guided by the interpretations given this phrase by the Federal Trade Commission (FTC) and the federal courts. In the United States Supreme Court case of *Federal Trade Commission v. Sperry & Hutchinson Co.*, 405 U.S. 233, 244-45 (1973) the Court stated that the FTC has described three considerations which may be looked to in determining whether a practice is "unfair."

1. Does it offend "public policy as it has been established by statutes, the common law, or otherwise?"

2. Is it "immoral, unethical, oppressive, or unscrupulous?"

3. Does it cause "substantial injury to consumers (or competitors or other businessmen)?"

Thus, as the Attorney General's findings on home heating oil make certain, such practices as refusal to serve cash customers, unduly restrictive delivery requirements, unnecessary surcharges, or unreasonable discriminatory prices or credit terms are within the Attorney General's authority to regulate. Such practices clearly meet the FTC's description of "unfair." They:

1. Violate the public policy clearly stated in the Maine statute which prohibits profiteering or unreasonable discrimination in the sale of necessities;

2. Are "oppressive" to consumers;

3. Cause a "substantial injury to consumers."